

xx complete. *to be published*  
with little interval.

# The Iron Age

## A Review of the Hardware, Iron and Metal Trades.

Published every Thursday Morning by DAVID WILLIAMS, No. 83 Reade Street, New York.

Vol. XX: No. 1.

New York, Thursday, July 5, 1877.

\$4.50 a Year, Including Postage.  
Single Copies, Ten Cents.

New Wrought Iron Bridge Design.

We publish in this issue two cuts illustrating a new design elliptic truss for wrought iron bridge building. The first cut upon this page represents a double span bridge of this kind, combined with the Pratt truss. The designer, Capt. William O. Douglass, of Binghamton, N. Y., sends a very interesting letter concerning the designs, from which we compile the following:

The wrought iron bridge illustrated on page 5 is new in bridge architecture. The supporting members are simple trusses, upon which the strains from a given load may be exactly and easily calculated, and each member may be exactly proportioned to its strain, thereby giving the greatest result in capacity and the least amount in material.

The feature of this truss is the combined arch and suspension principles, forming, in connection with the web members, an elliptical truss in which the thrust of the arch equipoises, and is equipoised by the pull of the cable. The arch may be a true segment of a circle or a hipped arch, as shown, through which the force is exerted in straight lines from point to point of support.

The strain upon the arch from a given load is much less than its versine (half of the depth of the truss) would indicate without close examination, inasmuch as the thrust of the arch tends to raise the cable to its chord or to a straight line from foot to foot of the arch. Thus the cable is made largely to support the load by a force which would be practically lost were the arch to thrust against a straight line chord, as in the "bow string" form. The same economy is true of the effects of the forces acting through the cable upon the arch and in the same manner.

The verticals between the arch and cable are preferably cylindrical in form, affording easy adjustment and connection with the chord members, resting as they do in iron seats cast to the bevel of the chords. The panel diagonals are strained least in the second panel, and less, also, in the panels between the hips of the arch than in those intermediate between them and the second panel. The end posts have no strain greater than the dead load of

the bridge and its moving load, and they may be omitted altogether when the water-way will admit. The floor is suspended from the trusses, the suspension bars being of round iron, passing through the chords or arch and cable, and also through the sheets or verticals. A slight chord is placed along the floor line, forming part of the usual sway brace system under the floor. The floor suspenders are strained by one panel load, and are connected with this chord and the iron floor girders. The cable is made of flat bars of iron. The arch is made of channel bars or I beams, or when the span is long angle iron and plates are riveted together, forming a box arch of sufficient ratio of diameter to length for this compressive member. This bridge is cheap and durable, exceedingly rigid and possesses great strength.

Referring to the double span illustration upon this page, we have the elliptical truss, before described, combined with the Pratt system. The strains upon the chords of the elliptical truss increase from center to end, while the strains upon the chords of the Pratt truss increase in the same ratio from end to center. Therefore, the aggregate chord strains in each panel throughout the truss are equal. The same conditions exist throughout the truss relative to the diagonals and verticals.

In considering this structure it is important to keep in view the fact that the verticals rest on and are placed between the chords, and are held in place by a rod passing through the chords and verticals, and to which the floor girders are attached. Also that the diagonals between the elliptical chords are not "counters," as might seem to appear, but are the main suspension bars of that truss. The elliptical chords serve all purposes of "counters." The usual and very proper objection to compound trusses is that their form defies the engineer in his efforts to resolve the forces or calculate its strains. This objection scarcely exists in this case, as the strains on each truss from the same load are entirely independent of one another in their action. Careful experiment has shown that it is easily susceptible of such adjustment that the weight may be caused equally by each or wholly by one of the simple trusses.

The strength of this structure is not wholly dependent upon the strength of any one individual member, as is the case in all of the

popular forms now in general use. This fact may serve to preclude the possibility of the occurrence of those disastrous accidents too frequently occurring upon our railways.

### The "Perfection" Pipe.

We show in the accompanying illustration a novelty in the line of stove pipe, which has many features of excellence. It is the easiest applied and most perfect fitting pipe which has come to our notice. It supplies the want which has long been felt of a stove pipe which can be put together by anyone without trouble or vexation, and which can be kept in stock in quantity without taking up any considerable share of valuable room in the shop of the dealer. In the "Perfection" pipe these qualities are secured in the simplest and best way. By the use of machinery every joint is made exactly like every other, so that the lengths are perfectly interchangeable, and no tools are needed in putting them together. A feature of great commercial importance in connection with the manufacture of this pipe is its compactness. One hundred joints can be shipped in two crates 10x24 inches inside. In this form the pipe can be shipped at fourth class rates of freight, with great economy to the dealer. Owing to its compactness the dealer can

earn Kentucky. It is also proper to state here that the State has been imperfectly prospected, and that it is altogether possible, and indeed probable, that the ores of one or another of these varieties will be found to be much more extensive and valuable than at present supposed.

*The Iron Ores of Eastern Kentucky.*—The ore districts of Eastern Kentucky, where the ores have been manufactured, are two, known as the Red River and the Hanging Rock iron regions. The Red River iron region embraces portions of Estill, Lee, Powell, Menifee and Bath counties. The ores found in this region are the Clinton ore, and an ore stratified, resting upon the sub-carboniferous limestone at the base of the coal bearing shales. It is found both as carbonate, or clay ironstone, and as limonite, or brown hematite. It is this ore which has been most largely worked, and upon which the excellent reputation of the iron from this region has been made. The Clinton ore has not been so extensively worked, but the principal deposit of it is situated geographically near this region, and may be said to belong to it. The best known deposit of this ore in Kentucky is in Bath county, on the waters of Slate Creek, and is known as the Slate Furnace Ore Bank. It is a stratified deposit of oolitic fossiliferous limonite, capping several hills in the vicinity. It reaches a thick-

Silica and insoluble silicates..... 11.530  
Combined water..... 12.300  
100.142

Metallic iron..... 49.042  
Phosphorus..... .707  
Sulphur..... .012

The dyestone ore, a fossiliferous hematite, extends along the flank and foot-hills of the Cumberland Mountain in Virginia, just across the State line from Kentucky, the crest of the mountain forming the line for about forty miles. It lies in two or three beds, ranging from six inches to three feet or more in thickness, and forms in the aggregate an enormous mass of cheaply obtainable ore. This ore, although situated in Virginia, is of the greatest importance to Kentucky, as it is destined to be smelted with Kentucky coals, which lie on the opposite side of the mountain, and are the only coals accessible to the ore, as there is no coal to the south of the mountain. This ore, although somewhat phosphatic, is easily worked, and yields from forty to fifty per cent. of iron. From this ore, smelted with stonecoal, iron will probably be made as cheaply as in any region of the country. The great Pine Mountain fault, which extends from some distance south of the Kentucky line in Tennessee, in a course about north thirty degrees east

cipally for car wheel purposes, as it is of very great strength and chills well. The following analyses show the character of the ore of this region:

No. 1.	No. 2.	No. 3.	No. 4.
Iron peroxide..... 66.129	61.535	74.127	65.501
Alumina..... 12.532	2.798	3.542	5.762
Lime carbonate, trace.	.459	.399	trace.
Magnesia..... .473	1.073	.401	.218
Phosphoric acid..... .709	.537	.601	.447
Silica and insoluble silicates..... 9.723	20.450	9.580	16.239
Combined water..... 9.580	9.800	11.270	11.060

Total..... 100.043 100.673 99.071 99.914

No. 1.	No. 2.	No. 3.	No. 4.
Metallic iron..... 46.440	45.874	51.589	45.914
Phosphorus..... .309	.234	.262	.105
From the Richardson Bank, Clear Creek, Bath county.			
No. 1. From Logan Ridge, Estill Furnace, Estill county.			
No. 2. From Thacker Ridge, near Fitchburg, Estill county.			
No. 3. From Horse Ridge, Cottage Furnace, Estill county.			
The above analyses were made by Dr. Peter and Mr. J. H. Talbott, chemists of the Kentucky Geological Survey, from samples selected by the writer.			

### THE HANGING ROCK IRON REGION.

The Kentucky division of the Hanging Rock iron region at present embraces the whole or parts of Greenup, Boyd, Carter and Lawrence counties. The ores are stratified carbonates and limonites, occurring in the lower coal measures, beginning with the ore just described, resting upon the sub-carboniferous limestone and extending through six hundred to seven hundred feet of the coal measure strata. The ores are mineralogically similar, but differ somewhat in their physical character and circumstances of deposition. They are popularly known as limestone, block and kidney ores. They usually occur at well defined geological levels, but do not always form connected beds. They also differ in thickness, ranging from four to eight inches in some of the thinner beds to fourteen feet in one local deposit. This latter is the Lambert ore of Carter county. The most common thickness is from six inches to one foot. There are from ten to twelve ore beds which are of more than local extent in this region. In addition there are numerous local beds, one or more of which is found at nearly every furnace. This region supports eleven charcoal and two stonecoal furnaces.

The following analyses by Dr. Peter and Mr. Talbott, of the Kentucky Geological Survey, show the composition of some of the ores of each class in this region:

No. 1.	No. 2.	No. 3.	No. 4.	No. 5.	No. 6.
Iron peroxide..... 67.859	54.535	68.986	61.444	66.500	39.979
Magnesia..... 1.169	1.155	1.160	1.140	1.150	1.150
Lime carbonate..... 1.180	1.180	1.180	1.180	1.180	1.180
Magnesia..... 1.180	1.180	1.180	1.180	1.180	1.180
Phosphoric acid..... .473	.143	.181	.647	.188	.135
Sulphur..... .473	.473	.136	.748	.182	.182
Silica and insoluble silicates..... 15.560	12.950	28.300	21.480	26.530	11.730
Combined water..... 10.000	10.000	11.000	11.000	11.000	11.000
Total..... 100.003	100.397	100.643	100.594	99.484	99.977

\* And loss

Phosphorus.....

Sulphur.....

Combined water.....

Total.....

100.000

100.395

100.643

100.594

99.484

99.977

No. 1. Lower limestone ore, Kenton Furnace, Greenup county.

No. 2. Upper limestone, Graham Bank, near Wilkins, Carter county.

No. 3. Upper limestone, Limestone Furnace, Greenup county.

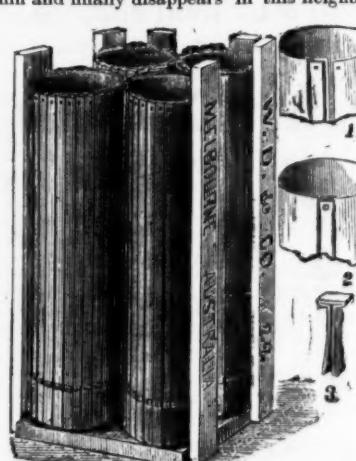
No. 4. Upper limestone, Mount Savage Furnace, Boyd county.

No. 5. Upper limestone, Mount Savage Furnace, Carter county.

No. 6. Upper limestone, Mount Savage Furnace, Carter county.

The Hanging Rock iron bears a reputation for excellence for general foundry purposes which is unsurpassed by any iron in the United States. The iron produced is mostly hot-blast charcoal iron, but some of the furnaces are worked with cold blast for the production of car wheel iron. The reputation of the iron of this region is, however, chiefly founded upon its excellence for castings of all sorts. The iron combines in a remarkable degree great strength with fluidity in casting and non-shrinkage on cooling. The stonecoal iron of this region is used almost entirely for the manufacture of bar iron and nails. The

[Continued on page 5.]



THE "PERFECTION" STOVE PIPE.

stow a full season's supply under his counter. The mode of packing is clearly shown in the cut, as also the form and method of joining. The small explanatory cut marked 1 shows the pipe as formed with the seam open; 2 shows the seam closed and secured by the clamp 3, which is of copper. From careful examination of samples of this pipe we speak of it with entire confidence and commend it to the favorable notice of the trade in the belief that it is a valuable improvement upon anything hitherto introduced. The Chicago Stamping Company are manufacturers under the patent, and control the sale of these goods in the United States. The low price at which they offer it will greatly facilitate its introduction.

### The Coal and Iron Resources of Kentucky.

(Concluded.)

#### IRON ORES.

The iron resources of Kentucky are extensive and varied. At a few localities a considerable development of them has been attained; but, taking the State as a whole, it has hardly reached a fraction of the possibilities of production. The greater portion of the ore territory of the State is as yet untouched by the pick of the miner, but enough has been done in most of the ore districts to learn the quality and something of the extent of the ores. Geographically the ore districts of the State may be divided into the eastern and western. Geologically the ores of most importance may be divided into three classes; as follows: 1. The Clinton ore of the Silurian period. This is the equivalent of the dyestone ore of Tennessee and Virginia. 2. The unstratified limonites of the sub-carboniferous limestone. 3. The stratified carbonates and limonites of the coal measures. There are also ores associated with the Waverly and Divonian shales in many parts of the State, which have been worked to some extent, but they are of minor importance in comparison with the other varieties of ore. Of the three classes of ore above named the first and the third are found in Eastern and the second and third in Western Kentucky. It may be said also that the ores of the coal measures are the best developed and of the most importance in Eastern, while the unstratified limonites of the sub-carboniferous limestone are of the greatest value in West-

ern Kentucky to the Chatterawah or Big Sandy River, at many places is of sufficient uplift to have brought the rocks of the Clinton or dyestone group above the drainage; and it is probable that on exploration the ore will be found in Kentucky. It has lain so long, unprotected by anything except a slight covering of earth, that it has absorbed water and been converted into a limonite. This deposit seems to be somewhat local—at least, of this thickness—as it grows thin and finally disappears in this neighbor-

hood. The limestone which bears the ore is, however, present in a narrow rim all round the central part of the State, and it is probable that, when thorough examination is made, other deposits of the ore will be found. The following analysis by Dr. Peter and Mr. Talbott, of the Kentucky Geological Survey, of a sample of ore from this deposit, shows the composition of the ore:

Iron peroxide..... 70.060

Alumina..... 4.540

Lime carbonate..... 0.40

Magnesia..... 0.021

Phosphoric acid..... 1.620

Sulphuric acid..... 0.031

## Metals.

**ANSONIA  
BRASS & COPPER CO.**  
19 and 21 Cliff Street,  
(Adjoining Office of Phelps, Dodge & Co.)

Sheet Brass, Plated Brass, Polished Brass Door Hails, Brass Wire, Hayden's Patent Brass Kettles, Brass Tubing, Lamp Burners, Star Burners.  
A large variety of Wood and Bronze Case Clocks.

Seamless Brass &amp; Copper Pipe.

THE ANSONIA  
Corrugated Stove Platform.  
SEE PAGE 9.

**Phelps, Dodge & Co.,**  
IMPORTERS OF

## TIN PLATE,

Sheet Iron, Copper, Pig Tin, Wire, Zinc, etc.

MANUFACTURERS OF

**COPPER and BRASS.**  
Cliff St., bet. John and Fulton,  
NEW YORK.

**DICKERSON, VAN DUSEN & CO.,**  
Importers of

Tin Plate, Pig Tin, Sheet Iron, Copper, Wire, Zinc, Etc.

A full assortment of

Iron and Steel Wire

AND

Galvanized "Ferro" Sheet Iron  
of the Cleveland Rolling Mill Co., manufacture, constantly in stock, all of which we can recommend as being superior to any in the market.

29 & 31 Cliff St., cor. Fulton,  
DICKERSON & CO. Liverpool, NEW YORK.

**SCOVILL MFG CO**

**BRASS,**  
HINCES, WIRE, GERMAN SILVER.

## PHOTOGRAPHIC GOODS.

BUTTONS,  
CLOTH AND METAL.

DEPOTS,  
419 & 421 Broome St., N. Y.  
112 Federal St., Boston,  
47 La Salle St., Chicago.

FACTORIES,  
W. A. Buoy, Conn.  
New Haven, Conn.  
New York City.

**THE NEW HAVEN  
COPPER CO.,**  
255 Pearl Street, New York.

Manufacturers of and Dealers in

**Braziers' & Sheathing  
COPPER.**

Kettle Bottoms, Bolts, Circles, Rivets, Ingot Copper, Spelter, Solder, &c.

**I. S. SPENCER'S SONS,  
IRON FOUNDERS**  
And Manufacturers.

GUILFORD, CONN. G. B. SPENCER.  
C. SPENCER. Superior Lock and other light gray iron castings made to order.

**The Wilmet Mfg. Co.,**  
96 John Street, Bridgeport, Conn.  
50 Barclay Street, New York.

Manufacturers of  
KEROSENE BURNERS AND LAMP  
TRIMMINGS, Etc.

We invite your attention to our extensive facilities for manufacturing, and assure you of our ability to meet the requirements of every branch of trade. The increasing demand upon us has made it necessary to extend our works, and we are now occupying the entire premises, No. 96 John Street, and our facilities for the manufacture of Metal Casting Goods, in Copper, Brass or other Sheet Metals, are unsurpassed. The use of the most approved machinery and appliances, and great experience and established reputation have been the result of our success, and we solicit still more extended relations with those who require work of this class, and we take this method of calling your attention to our establishment.

**R. SELLEW & CO.**  
Dealers in METALS,  
Tin Plate, Sheet Iron, Copper, &c.  
SAINT LOUIS.

**PERFORATED METALLIC BUNDLES  
SKYLIGHTS  
G. HAYES**  
71 EIGHTH AVE., NEW YORK  
PERFORATED SHEET METALS

## Metals.



**Waterbury Brass Co.**

CAPITAL, \$400,000.  
JOHN SHERMAN, Agent,  
296 Broadway, New York.

Mills at WATERBURY, CONN.  
Sheet, Rolled and Platers' Brass,  
GERMAN SILVER,

Copper, Brass & German Silver Wire,  
BRASS AND COPPER TUBING,

COPPER RIVETS & BURS,  
BRASS KETTLES,  
WASH BASINS,

Door Rail, Brass Tags & Step Plates,  
PERCUSSION CAPS,

POWDER FLASKS,  
Metallic Eyelets,  
Shot Pouches,

Tape Measures, etc.

**Manhattan Brass Co.,**  
Manufacturers of

Sheet Brass, Oiled Patent Oillers, Prior Patent Oillers, Broughton Patent Oillers, Copper Rivets, Brass, Tin & Zinc Oillers, Brass Tubing, Spelter Tubing, Grate Trimmings, Baby Carriage Hardware, Satchel Frames, Stationers' Hardware.

**BRASS BLANKS & TUBES**  
OF EVERY DESCRIPTION TO ORDER.  
Agents for Hartford Eyelet Co.

Office, 83 Reade cor. Church Sts., N. Y.  
Works, 1st Ave., 27th to 28th Sts., N. Y.  
J. H. WHITE, President. H. L. COE, Secretary.

49 Chambers St. 18 Federal St.  
Manufacturers of all kinds of

Brass, Copper & German Silver,  
ROLLED AND IN SHEETS.

**BRASS & COPPER WIRE,**

Tubing, Copper Rivets & Burs.

**BRASS & IRON**

JACK CHAIN, DOOR RAIL.

German Silver Spoons.

SILVER PLATED FORKS & SPOONS,

Kerosene Burners, &c.

**JOHN DAVOL & SONS,**

Agents for Brooklyn Brass and Copper Co.,

Dealers in

Ingot Copper, Spelter, Lead, Tin, Antimony, Solder & Old Metals.

100 John Street, N. Y.

**Bailey, Farrell & Co**

**BRASS FINISHERS**  
and

**FOUNDERS.**

**Brass Work**

FOR

Plumbers, Gas and Steam Fitters.

ENGINE BUILDERS.

Pittsburgh, Pa.

New Catalogue packed with first order or mailed on receipt of eight stamp.

**BALTIMORE**

**COPPER WORKS.**

**POPE, COLE & CO.,**

Are now Purchasing

**Copper Ores**

and smelting and refining at these works, where, with experienced workmen and unusual facilities, we are turning out Ingots and Cakes of Copper of unequalled purity.

We are prepared to buy Ores, Matte, Regniss and other furnace material, in any quantities.

Office, 57 South Gay St., Works at Canton.

Baltimore Md.

**PASSAIC ZINC CO.**

Manufacturers of

**Pure Spelter**

FOR

Cartridge Brass, Gas Fixtures, Bronzes

AND ALL FINE WORK.

Also for

Galvanizers & Brass Founders.

**MANNING & SQUIER, Gen'l Agents**

113 Liberty Street, N. Y.

## Metals.

**The Plume & Atwood**

**Mfg. Company**

MANUFACTURERS OF

**SHEET and ROLL BRASS and WIRE,**

German Silver and Gilding Metal,

Copper Rivets and Burs,

**Kerosene Burners,**

Shoe Eyelets, Lamp Trimmings, &c.

80 Chambers Street, New York.

13 Federal Street, Boston.

ROLLING MILL, Factories,

THOMASTON, CL. WATERBURY, CT.

**Brass Goods  
Mfg. Co.,**

280 Pearl St., N. Y., Manufacturers of

Stamped Brass & Silvered Goods

PLATED ROSES, PICTURE NAILS,

THIMBLES, DISKS,

SCUTCHEONS, BRASS CAPS,

DROP BASES, LABLES.

**Patent Mirror Business Cards,**

The only indestructible and most attractive card, specially made for expositions, fairs, &c.

**Patent Tin Handle Muffle Caps & Brushes.**

Special facility for manufacturing small articles of new style and design to order.

**EDWARD MILLER & CO.,**

Manufacturers of

**SHEET BRASS,**

**Brass Kettles, Lanterns**

OILERS, KETTLE EARS,

SPOUTS, TINMEN'S TRIMMINGS, KEROSENE

LAMPS, BURNERS, TRIMMINGS, &c.

35 Warren Street, New York.

Mill and Factories, Meriden, Conn.

**HOOKS SMELTING CO.**

SUCCESSORS TO

H. W. HOOK, METALLURGIST.

SMELTER & BRASS FOUNDER

MANUFACTURER OF ALL KINDS OF

BRASS CASTINGS, TYPE, STEREOGRAPHY,

BABBIT & ANTI-FRICTION METALS.

ALSO IMPORTER OF BLOCK TIN, LEAD,

BROAD & HAMILTON ST. PHIL.

Railroad and Machinists' Supplies.

**New Jersey Wire Mill.**

**HENRY ROBERTS,**

Manufacturer of

**Steel & Iron Wire.**

**SPECIALTIES:**

Tinned Wire, Tinned Broom, Spring Wire, made from Bessemer Steel; Cast Steel and Iron Coped Ball Wire; Rivet, Screw, Buckle, Umbrella, Fence, Brush, Gun Screw Wire; Sewing Machine and Machinery Wire. Fine Wire for weaving. Also Wire of any shape made to order.

**WIRE MILL, 39 Oliver St., Newark, N. J.**

**THE**

**Gilbert & Bennett Mfg. Co.,**

GEORGETOWN, CONN.,

MANUFACTURERS OF

**Iron Wire, Curled Hair**

AND GLUE.

**GILBERT & BENNETT MANUFACTURERS OF**

**IRON & BRASS ROLLING**

**CO.**

**ESTABLISHED 1816.**

**Coal, Oats and Hair Sieves.**

**Brass and Iron Riddle Sieves.**

**Cheese Scales.**

**Coal and Sand Screens.**

**Wire Ox. Muzzles.**

**Stove Cover Lathers.**

**Coal Hinges and Shovels.**

**Steel Scrapers and Pokers.**

**Cotton, Oats and Hair Sieves.**

**Brass and Iron Riddle Sieves.**



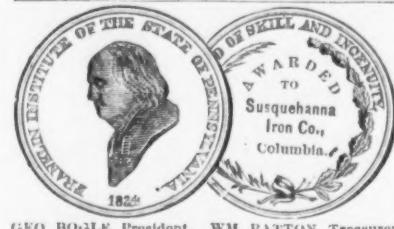
<p><b>Kron.</b> NEW YORK.  <b>OGDEN &amp; WALLACE,</b> Successors to GAM'L G. SMITH &amp; CO., <b>IRON &amp; STEEL,</b> 85, 87, 89 &amp; 91 ELM ST., N. Y. <b>COMMON AND REFINED</b> <b>BAR IRON.</b> SHEET AND PLATE IRON, HOOP, BAND AND SCROLL IRON, Rod and Horse Shoe Iron, Angle and T Iron, Swedean &amp; Norway Iron, Norway Nail Rods. Iron of all sizes and shapes made to order.</p>	<p><b>Kron.</b> NEW YORK.  <b>G. HUERSTEL,</b> <b>IRON and STEEL.</b> Warehouse, 99 Market Slip, N. Y. <b>IRON AND STEEL</b> of all kinds Constantly on hand. Horse Shoe Iron and Nails, Norway Iron, Cast Spring, Tin Calk, and Bessemer Steel Tire. Also, SPRINGS, AXLES AND BOLTS, For Truck and Carriage Makers.</p>	<p><b>Kron.</b> NEW YORK.  <b>T. D. HAZARD,</b> Broker in <b>NEW &amp; OLD RAILS,</b> Foreign and Domestic <b>PIG IRON,</b> Wrought and Cast Scrap Iron AND GENERAL METALS. 204 Pearl St., New York.</p>	<p><b>Kron.</b> NEW YORK.  <b>J. &amp; J. Rogers Iron Co.,</b> <b>AUSABLE FORKS,</b> Essex Co., - - - N. Y. Manufacturers of <b>FINE CHARCOAL</b> <b>BLOOMS &amp; BARS</b></p>	<p><b>Kron.</b> PITTSBURGH.  <b>PENNSYLVANIA IRON WORKS.</b> <b>EVERSON, MACRUM &amp; CO.</b> Pittsburgh, Pa., Manufacturers of every description of Bar, Sheet and Small Iron, Make a specialty in Fine and Common Sheet Iron.</p>
<p><b>PIERSON &amp; CO.,</b> 24 &amp; 26 Broadway, 77 &amp; 79 New St., NEW YORK CITY. "PICKS" of all kinds, <b>ESOPUS</b> HORSE SHOE IRON BEAMS, ANGLES, Tees, Channels, Sheets, Plates. All descriptions in stock.</p>	<p><b>A. B. Warner &amp; Son,</b> <b>IRON MERCHANTS,</b> 28 &amp; 29 West and 52 Washington Sts. <b>BOILER PLATE,</b> Boiler Tubes, Angle, Tee &amp; Girder Iron, Boiler and Tank Rivets. Sole Agents for the celebrated "Eureka," Pennocks, "Wawasset," Lukens, Brands of Iron. Also all descriptions of Plate, Sheet, and Gaugometer Iron. Special attention to Locomotive Iron. Fire Box Iron a specialty.</p>	<p><b>A. B. Warner &amp; Son,</b> <b>IRON MERCHANTS,</b> 28 &amp; 29 West and 52 Washington Sts. <b>BOILER PLATE,</b> Boiler Tubes, Angle, Tee &amp; Girder Iron, Boiler and Tank Rivets. Sole Agents for the celebrated "Eureka," Pennocks, "Wawasset," Lukens, Brands of Iron. Also all descriptions of Plate, Sheet, and Gaugometer Iron. Special attention to Locomotive Iron. Fire Box Iron a specialty.</p>	<p><b>U. O. CRANE,</b> Broker in <b>PIG IRON &amp; METALS,</b> 104 John St. New York. John W. Quincy, 98 William Street, New York. Anthracite &amp; Charcoal Pig Irons, Wrought Scrap, Cut Nails, Copper, BLOCK TIN, LEAD, SPELTER, ANTIMONY, NICKEL, &amp;</p>	<p><b>A. G. HATRY,</b> Manufacturers' Agent and Broker Bar, Sheet, Tank, Boiler, Angle, T, and Railroad Iron, Nails &amp; Spikes, Steel &amp; R. R. Supplies. PITTSBURGH, PA.</p>
<p><b>IRON &amp; STEEL.</b>  <b>J. H. JACKSON &amp; CO</b> 200 &amp; 202 Franklin St., N. Y. Importers and Dealers in <b>IRON and STEEL.</b> Agents for JOHN A. GRISWOLD &amp; CO'S Bessemer Steel. MACHINERY STEEL, Cast Steel and SPRING STEEL, ANGLE and T IRON. Special Irons for Bridge and Architectural Work.</p>	<p><b>POWERVILLE</b> <b>ROLLING MILL,</b> JOHN LEONARD, 450 &amp; 451 West Street, NEW YORK. Manufacturer of Best Quality <b>HORSE SHOE IRON,</b> And HOOPS. Also Best Quality Cold Blast Charcoal Scrap Blooms, And Dealer in OLD IRON.</p>	<p><b>POWERVILLE</b> <b>ROLLING MILL,</b> JOHN LEONARD, 450 &amp; 451 West Street, NEW YORK. Manufacturer of Best Quality <b>HORSE SHOE IRON,</b> And HOOPS. Also Best Quality Cold Blast Charcoal Scrap Blooms, And Dealer in OLD IRON.</p>	<p><b>BOONTON</b> <b>CUT NAILS,</b> <b>HOT PRESSED NUTS,</b> Machine Forged Bolts, Washers.</p>	<p><b>COYNE &amp; HATRY,</b> Patentees and Manufacturers of Automatic Nail Selectors, Improved Cut Nail Machines, AND NAIL FACTORY SUPPLIES. WORKS, cor. 20th &amp; Mulberry Sts., OFFICE, No. 114 &amp; 115 Water St., Pittsburgh, Pa.</p>
<p><b>ABEEL BROTHERS,</b> Established 1765 by ABEEL &amp; BYANCK, <b>Iron Merchants,</b> 190 South Street and 365 Water, N. Y. <b>ULSTER IRON</b> A full assortment of all sizes constantly on hand. Refined Iron, Horse-Shoe Iron, Common Iron. Band, Hoop and Scroll Iron. Sheet Iron. Norway Nail Rods. Norway Shapes. Cast, Spring and Tire Steel, etc.</p>	<p><b>Geo. A. Boynton,</b> BROKER IN IRON 70 WALL ST., N.Y.</p>	<p><b>MARSHALL LEFFERTS</b> 90 Beekman St., New York, MANUFACTURER OF <b>AMERICAN</b> Galvanized Sheet Iron, AND AGENT FOR THE Easton Sheet Iron Works, Easton Pa. MANUFACTURER OF Best Bloom, Charcoal &amp; Refined Sheet Iron. Galvanized Telegraph and Fence Wire Galvanized and Tinned Roofing and Slatting Nails. Galvanized Hoop Iron of all widths. Galvanized Staples. Corrugated Iron for Roofs, plain or gal'd. Galvanized Bars and Chains for Cemetery Fencing. Tin Plates, Spelter, and other Metals.</p>	<p><b>BURDEN'S</b> <b>HORSE SHOES.</b> "Burden Best" Iron Boiler Rivets.</p>	<p><b>JUNIATA</b> <b>Horse &amp; Mule Shoes</b> NAILS AND SPIKES, Horse Shoe Bar, AND SHEET IRON. Goods warranted equal to any in the Market. Send for Circulars in regard to "PICKED NAILS." Cor. 15th and ETNA STREETS, PITTSBURGH, PA.</p>
<p><b>A. R. Whitney &amp; Bro.,</b> Manufacturers of and Dealers in <b>IRON,</b> 56, 58 &amp; 60 Hudson, 18, 20 &amp; 22 Thomas, and 12, 14 &amp; 16 Worth Sts., Our specialty is in Manufacturing Iron Used in the Construction of Fire-Proof Buildings, Bridges, &amp;c. Plans and estimates furnished, and contracts made for erecting Iron Structures of every description. Books containing cuts of all Iron made sent on application by mail. Simple pieces at office. Please address 58 Hudson Street.</p>	<p><b>SCRAP IRON,</b> <b>Pig Iron,</b> <b>OLD METALS.</b> 88 to 104 Mangin Street, Foot of Stanton St., E. R., NEW YORK.</p>	<p><b>BURDEN'S</b> <b>HORSE SHOES.</b> "Burden Best" Iron Boiler Rivets.</p>	<p><b>TAYLOR IRON.</b> Unequalled for Strength, Soundness and Uniformity, and Capable of Receiving the Highest Finish. Orders executed from store with immediate dispatch.</p>	<p><b>W. P. TOWNSEND &amp; CO.,</b> Manufacturers of <b>WIRE</b> AND Black and Tinned Rivets Of Choicest Charcoal Iron. Rivets any diameter up to 7-16 inch and ANY LENGTH required. 19 &amp; 21 Market St., Pittsburgh, Pa.</p>
<p><b>BORDEN &amp; LOVELL,</b> Commission Merchants 70 &amp; 71 West St., New York. Agents for the sale of Fall River Iron Co.'s Nails, Bands Hoops &amp; Rods AND Borden Mining Company's Cumberland Coals.</p>	<p><b>SCRAP IRON,</b> <b>Pig Iron,</b> <b>OLD METALS.</b> 88 to 104 Mangin Street, Foot of Stanton St., E. R., NEW YORK.</p>	<p><b>BURDEN'S</b> <b>HORSE SHOES.</b> "Burden Best" Iron Boiler Rivets.</p>	<p><b>RANDALL &amp; JONES,</b> Sole Representatives in the United States and Canadas, No. 10 Oliver St., Boston.</p>	<p><b>PLATE &amp; SHEET IRON</b> OFFICE, at Works. <b>A. J. NELLIS &amp; CO.,</b> Manufacturers of Steel or Wrought and Malleable Iron Fencing, Castings, Railings, &amp;c., warranted free from breakage. Special attention given to orders for approved designs for Cemeteries. Also, manufacturers of Agricultural Steels of all descriptions. Steels finished and tempered by NELLIS' PROCESS to suit any kind of soil. Special attention given to the manufacture of Nellis' Original Harpoon Horse Hay Fork Grapnel and Wood Wheel Wrought Frame Horse Fork Pulleys. <b>Medal awards on all goods of our manufacture exhibited at the Centennial.</b></p>
<p><b>WILLIAM H. WALLACE &amp; CO.,</b> <b>IRON MERCHANTS</b> Cor. Albany &amp; Washington Sts., NEW YORK CITY. W. H. WALLACE.</p>	<p><b>JAMES WILLIAMSON &amp; CO.,</b> SCOTCH AND AMERICAN <b>PIG IRON,</b> No. 69 Wall St., New York.</p>	<p><b>PASSAIC ROLLING MILL CO.,</b> PATERSON, N. J. <b>IRON BRIDGE BUILDERS</b> And Manufacturers of Beams, Channels, Angles, TEES, Merchant Iron, &amp;c., &amp;c. New York Office, 138 Chambers Street.</p>	<p><b>BOSTON ROLLING MILLS</b> Manufacture Extra quality small rods, from best selected Scrap Iron. <b>SWEDISH AND NORWAY SHAPES,</b> Nail and Wire Rods. Also, <b>HORSE SHOE IRON, HAND MADE</b> <b>HORSE SHOES &amp; THE BOSTON</b> <b>HORSE SHOE.</b> BOSTON ROLLING MILLS, W. R. ELLIS, Treas. Office, 17 Batterymarch St., Boston.</p>	<p><b>GEO. S. MOORE &amp; CO.,</b> PIG IRON, IRON ORE, FIRE BRICK. LOUISVILLE, KY.</p>
<p><b>DANIEL F. COONEY,</b> (late and Successor to Jas. H. Holdane &amp; Co.) 58 Washington St., N. Y. <b>BOILER PLATES and SHEET IRON,</b> LAP WELDED BOILER FLUES. Bolts, Rivets, Angle &amp; T Iron, Cut Nails &amp; Spikes. Agency for Pittsfield Iron Co., Vladuct Iron Works, Lebanon Rolling Mills, Pitts Iron Works, Laurel Iron Works, The Bergen Rolling Mills, Jersey City.</p>	<p><b>IB</b> <b>HP</b> <b>03</b> BARS suitable for Steel of all grades, Wire, Shovels, Hoes, Scythes, Carriage Bolts, Nail Rods, Tacks, &amp;c. <b>CHARCOAL PIG IRON</b> for Bessemer and Car Wheels. <b>MUCK BARS</b> for Steel Smelting and Re-rolling. <b>SCRAP OR BAR ENDS.</b> Direct Agency for N. M. HÖGLUND, of Stockholm, represented in the United States by <b>NILS MITANDER,</b> 69 William St., New York, and 24 Congress Street, Boston. ALBERT POTTS, Philadelphia, Pa., AGENT.</p>	<p><b>PATRICK &amp; CO.,</b> YOUNGSTOWN, OHIO. <b>SPENCER &amp; UNDERHILL,</b> 94 Chambers St., N. Y., Agents for American Screw Co.'s Wood, Machine and Rail Screws, Stove and Tire Bolts, Rivets, &amp;c. <b>O. AMES &amp; SONS,</b> Shovels, Spades and Scops. <b>A. FIELD &amp; SON,</b> Tacks, Brads, Nails, &amp;c. <b>G. F. WARNER &amp; CO.,</b> Carriage Clamps. We have also on hand a general assortment of Hardware.</p>	<p><b>W. H. COOKE</b>, President. W. O. FAVERWEATHER, Treasurer. CHAS. O. BROWN, Engineer.</p>	<p><b>SABLE IRON AND NAIL WORKS.</b> ESTABLISHED 1828. <b>ZUG &amp; CO.,</b> Our Rolling Mill and Nail Factory having been remodeled, possess all modern improvements and facilities for the manufacture of Iron and Nails, enabling us to place on the market goods of an superior quality and finish. Our Nails are selected by the use of "Coyne's Automatic Nail Picker." Our Iron is especially adapted for uses when quality is a consideration, and by the use of our Universal Mill we are able to fill orders of odd sizes of Iron with promptness. OFFICE and WORKS: Etna and 13th Streets, Pittsburgh Pa.</p>
<p><b>W. &amp; J. TIEBOUT,</b> Manufacturers of Trass, Galvanized and Ship Chandlery <b>HARDWARE.</b></p>	<p><b>BONNELL, BOSTFORD &amp; CO.,</b> Iron, Nails &amp; Spikes. YOUNGSTOWN, OHIO. <b>THOMAS J. POPE &amp; BRO.</b> <b>BORAX</b> Of Finest Qualities. METALS. 292 Pearl Street, near Beekman, N. Y.</p>	<p><b>W. H. COOKE</b>, President. W. O. FAVERWEATHER, Treasurer. CHAS. O. BROWN, Engineer.</p>	<p><b>WESTFÄLISCHE UNION.</b> Actien-Gesellschaft fur Bergbau, Eisen and Draht-Industrie, Hamm, Westphalia, Germany, WORKS at Hamm, Nachrodt, Lippstadt, Werdohl, Einsal, St. Petersburgh. MANUFACTURERS OF</p>	<p><b>CUT NAIL RODS,</b> <b>WIRE NAILS,</b> Bolt and Rivet Iron, Hoop Iron, Nail Iron, Iron for Horse Shoe Nails, Washers,</p> <p><b>IRON WIRE,</b> Drawn Bright Wire, Drawn Hoop and Steel Wire, Drawn Coppered, Tinned and Galvanized Wire,</p> <p>Galvanized and Oiled Telegraph Wire, Upholsterers' Springs, Bolts and Rivets, Nuts, Screws.</p>
<p><b>PIERSON &amp; CO.,</b> 24 &amp; 26 Broadway, 77 &amp; 79 New St., NEW YORK CITY. "PICKS" of all kinds, <b>ESOPUS</b> HORSE SHOE IRON BEAMS, ANGLES, Tees, Channels, Sheets, Plates. All descriptions in stock.</p>	<p><b>A. B. WARNER &amp; SON,</b> <b>IRON MERCHANTS,</b> 28 &amp; 29 West and 52 Washington Sts. <b>BOILER PLATE,</b> Boiler Tubes, Angle, Tee &amp; Girder Iron, Boiler and Tank Rivets. Sole Agents for the celebrated "Eureka," Pennocks, "Wawasset," Lukens, Brands of Iron. Also all descriptions of Plate, Sheet, and Gaugometer Iron. Special attention to Locomotive Iron. Fire Box Iron a specialty.</p>	<p><b>U. O. CRANE,</b> Broker in <b>PIG IRON &amp; METALS,</b> 104 John St. New York. John W. Quincy, 98 William Street, New York. Anthracite &amp; Charcoal Pig Irons, Wrought Scrap, Cut Nails, Copper, BLOCK TIN, LEAD, SPELTER, ANTIMONY, NICKEL, &amp;</p>	<p><b>J. &amp; J. ROGERS IRON CO.,</b> <b>AUSABLE FORKS,</b> Essex Co., - - - N. Y. Manufacturers of <b>FINE CHARCOAL</b> <b>BLOOMS &amp; BARS</b></p>	<p><b>PITTSBURGH.</b> <b>PENNSYLVANIA IRON WORKS.</b> <b>EVERSON, MACRUM &amp; CO.</b> Pittsburgh, Pa., Manufacturers of every description of Bar, Sheet and Small Iron, Make a specialty in Fine and Common Sheet Iron.</p>
<p><b>PIERSON &amp; CO.,</b> 24 &amp; 26 Broadway, 77 &amp; 79 New St., NEW YORK CITY. "PICKS" of all kinds, <b>ESOPUS</b> HORSE SHOE IRON BEAMS, ANGLES, Tees, Channels, Sheets, Plates. All descriptions in stock.</p>	<p><b>A. B. WARNER &amp; SON,</b> <b>IRON MERCHANTS,</b> 28 &amp; 29 West and 52 Washington Sts. <b>BOILER PLATE,</b> Boiler Tubes, Angle, Tee &amp; Girder Iron, Boiler and Tank Rivets. Sole Agents for the celebrated "Eureka," Pennocks, "Wawasset," Lukens, Brands of Iron. Also all descriptions of Plate, Sheet, and Gaugometer Iron. Special attention to Locomotive Iron. Fire Box Iron a specialty.</p>	<p><b>U. O. CRANE,</b> Broker in <b>PIG IRON &amp; METALS,</b> 104 John St. New York. John W. Quincy, 98 William Street, New York. Anthracite &amp; Charcoal Pig Irons, Wrought Scrap, Cut Nails, Copper, BLOCK TIN, LEAD, SPELTER, ANTIMONY, NICKEL, &amp;</p>	<p><b>J. &amp; J. ROGERS IRON CO.,</b> <b>AUSABLE FORKS,</b> Essex Co., - - - N. Y. Manufacturers of <b>FINE CHARCOAL</b> <b>BLOOMS &amp; BARS</b></p>	<p><b>PITTSBURGH.</b> <b>PENNSYLVANIA IRON WORKS.</b> <b>EVERSON, MACRUM &amp; CO.</b> Pittsburgh, Pa., Manufacturers of every description of Bar, Sheet and Small Iron, Make a specialty in Fine and Common Sheet Iron.</p>

## IRON.

PHILADELPHIA.

**T. Horace Brown,**  
IRON, METALS & MINERALS,  
205½ Walnut St., PHILADELPHIA.

AGENT FOR  
Bechtelsville Iron Co.,  
Wood Bros.' Charcoal Blooms & Billets  
Virginia Bessemer Ore Co.



GEO. BOGLE, President. WM. PATTON, Treasurer.  
**SUSQUEHANNA IRON CO.,**  
Columbia, Lancaster Co., Pa.  
Manufacturers of and Dealers in

# IRON,

All leading sizes made to order and of uniform quality. Such as Flats, Rounds and Square Bars, Ovals, Half Ovals and Half Rounds.

Works situated on the line of the Pennsylvania R. R. and at the junction of Reading and Columbia Northern Central and Columbia and Port Railroad.

**A. PURVES & SON,**  
Corner South & Penn Streets, Phila.,  
Dealers in

Scrap Iron & Metals, Machinery, Tools,  
Shafting & Pulleys, Steam Engines,  
Pumps & Boilers, Copper, Brass,  
Tin, Babbitt Metals, Foundry  
Facings. Best Quality Ingot Brass.  
Cash paid for all kinds of Metals and Tools.

## IRON.

PHILADELPHIA.

**H. L. GREGG & CO.,**  
Ship Brokers & Commission Merchants,  
Importers of

### Old Iron, Metals and Rags.

Freight engagements made to all parts of the world.  
Marine insurance effected in reliable offices.

108 Walnut St., Phila.

**W. D. WOOD & CO.'S**



### PATENT Planished Sheet Iron.

Patented March 14th, 1865; April 8th, 1873;  
Sept. 9th, 1873; Oct. 6th, 1874; Jan. 11, 1876.

Guaranteed fully equal in all respects to the  
**IMPORTED RUSSIA IRON,**  
and at a much less price.

### FOR SALE,

by all the principal

### METAL DEALERS

In the Large cities throughout

### THE UNITED STATES.

And at their Office,

111 Water Street PITTSBURGH, PA.

## The Cambria Iron and Steel Works,

Having enjoyed for over TWENTY YEARS the reputation of producing the best quality of

### RAILS,

have now an annual capacity of

100,000 Tons of Iron and Steel Rails, Splice Bars, &c.

ADDRESS,

### CAMBRIA IRON COMPANY,

No. 218 South 4th Street, Philadelphia.

Or at the Works, JOHNSTOWN, P.A.

Or J. S. KENNEDY &amp; CO., New York Selling Agency, 41 Cedar St., N. Y.

## THE PHOENIX IRON CO.,

410 Walnut Street, PHILADELPHIA.

Manufacturers of

### CURVED, STRAIGHT AND HIPPED Wrought Iron Roof Trusses, Beams, Girders & Joists,

and all kinds of Iron Framing used in the construction of Iron Proof Buildings.

### DECK BEAMS, CHANNEL, ANGLE AND T BARS

curved to template, largely used in the construction of Iron Vessels.

### PATENT WROUGHT IRON COLUMNS, WELDLESS EYE BARS,

For Top and Bottom Chords of Bridges.

### REFINED BAR, SHAFTING, and every variety of SHAPE IRON made to Order.

Plans and Specifications furnished. Address,

SAMUEL J. REEVES, President.

**Kensington Iron & Steel Works.**  
**JAMES ROWLAND & CO.,**  
920 N. Delaware Ave., PHILADELPHIA,  
Manufacturers of

The Anvil Brand  
**REFINED IRON,**  
BEST

Rounds, Square and Flat Bars, Bands,  
Skeps, Hoop and Horse Shoe Iron, Ovals,  
Half Ovals, Half Rounds, Scrolls and Nut  
Iron. An assortment of sizes constantly in  
stock. Also Plow, Cultivator, Hoe and Shovel  
Steel. Send for Price List.

**TRADE MARK**

**PENCOYD IRON WORKS.**  
**A. & P. ROBERTS & CO.,**  
Manufacturers of  
**CAR AXLES.**  
BAR, ANGLE, TEE AND CHANNEL IRON.  
Office, No. 265 S. Fourth St., Philadelphia. Agents for the sale of Glamorgan Pig Iron.

STANDARD

**FOUNDRY FACINGS.**  
GERMAN LEAD, BITUMEN,  
AMERICAN LEAD, ANTHRACITE,  
GRAPHITE, CHARCOAL,  
PLUMBAGO, MINERAL,  
J. W. PAXSON & CO. 514, 516 and 518 Beach St., Philadelphia, Pa.

**Moseley Iron Bridge & Roof Co.,**  
CORRUGATED IRON  
Buildings, Roofs, Shutters, Doors, Iron  
Sashes, Skylights, &c.  
5 Dey Street, New York.

**Siemens' Regenerative  
GAS FURNACE.**  
RICHMOND & POTTS,  
119 S. Fourth St., PHILADELPHIA, PA.

S. B. LOWE,

Chattanooga, Tenn.

### Pig Iron & Commission

Special Sales Agent of

Rising Fawn, Chattanooga &amp; Cherokee

Furnaces.

Special low rates of freight obtained to all principal points North, West and South.

[Continued from page 1.]  
**The Coal and Iron Resources of Kentucky.**

stonecoal iron is made from the ores of this region mixed with a considerable proportion of ore from other states. The fuel used is the celebrated Ashland or Coalton coal. It is a dry burning, non-coking coal, which is used raw in the furnace, and is of such excellent quality that no admixture of coke with it in the furnaces is necessary, as is the case with most of the other non-coking furnace coals of the West. The charcoal iron is manufactured exclusively from the native ores, which yield, as shown by the books at a number of the furnaces, for periods ranging from one to four years, an average of between 31 and 32 per cent. of iron. The ores of the region are known as limestone, block and kidney ores. These names are due to peculiarities of structure or position, rather than to any essential difference in chemical composition. As a rule, however, the limestone ores are the richest and most uniform in quality. The kidney ores are next in value; while the block ores prove greater variations in quality than any other, some of them being equal to the best of this region, and some so silicious and lean that they cannot be profitably worked.

### THE IRON ORES OF WESTERN KENTUCKY.

The most extensive and best developed ore region of Western Kentucky is called the Cumberland River iron region. It embraces the whole or parts of Trigg, Lyon, Livingstone, Crittenden and Caldwell counties. The ores of this region are limonites found resting in the clay and chert above the St. Louis or sub-carboniferous limestone. They occur in deposits of irregular shape and uncertain extent, but in the aggregate the amount of ore is immense. The ores are distributed with great irregularity throughout this region, but they seem to be found in greatest abundance and quantity where the limestone has been most extensively worn away, and where, as a consequence, the clay and chert which are the result of its decomposition are of greatest thickness. The ores are, perhaps, found in greater abundance in the country between the Cumberland and Tennessee rivers than in any other portion

greater development than it has yet attained. The charcoal iron manufacture will always be an important and extensive industry, for over a large part of the region the most profitable use that can be made of the land is the production of timber for charcoal. There is destined at no far distant day to be a large stone coal or coke iron industry established here, using the ores of this region with the coals of the Western Kentucky coal field, either raw or coked. The best known of the Western coals at present are too sulpherous for use in iron making without previous separation from sulphur by washing and coking. It is through the introduction of modern machinery and ovens, by which these operations can be cheaply and thoroughly effected, and a coke fit for iron smelting produced, that the coal and iron ore of Western Kentucky will be most profitable and extensively developed. The Louisville, Paducah and Southwestern Railroad affords direct communication between the coal and ore fields. Already measures are in progress for the erection of extensive coke works on the line of this railroad, which will doubtless prove but the first step in the successful development of a different form and more extensive iron industry than any yet established in Western Kentucky.

### THE NOLIN RIVER DISTRICT.

In Edmonson and Grayson counties, north of Green River, between Nolin River and Bear Creek, is an area of considerable size called the Nolin River District. The ores of this region are stratified carbonates and limonites, found near the base of the coal measures. The ore of most value occurs above the conglomerate. It is about four feet thick, and, so far as present developments indicate, underlies an area of large extent. It is almost wholly undeveloped. A number of years since a small charcoal furnace was established on Nolin River, but it was so far from market, and transportation of the iron was so uncertain and expensive, that the enterprise soon failed. It ran long enough, however, to establish the fact that an excellent iron could be made from these ores. The following analyses, by Dr. Peter and Mr. Talbott, show the quality of a sample of this ore from near the head of Beaver Dam Creek, in Edmonson County:

establishing a well recognized principle of law. It determines that when iron is passed by a buyer's engineer and a certificate given, the consumer has thenceforward no right to sue for damages for any defects which may afterward appear. In 1871, Messrs. Hopkins, Gilkes & Co., of Middlesbrough, contracted to supply a large quantity of iron rails and fish plates to an Anglo-Russian railway company—the Dunberg-Witepsk. The rails were rolled under the superintendence of a representative of the engineer (Sir John Hawkshaw), and he watched them at every step, testing them whenever he chose. The rails were completed according to contract, and Sir John Hawkshaw gave the necessary certificate, after which payment was made. The rails were laid down, and after standing the severity of a Russian winter, various defects were noticed in them. The railway company at once sued the manufacturers for £60,000 damages, for what they alleged to be breach of contract. This was in 1873. The matter was referred to arbitration, and the arbitrator, Mr. J. B. Maule, Q. C., decided in favor of Messrs. Hopkins, Gilkes & Co.; but before making his award he stated a special case to the law courts, raising the question as to the finality of the engineer's certificate. In delivering their opinion on this, the judges unanimously agreed that the plaintiffs' right of action was destroyed when the rails had been completed and certified as being according to specification.

### News From Abroad About the American Tariff.

The New York correspondent of the Sheffield Telegraph writes as follows, under date of June 16th. If there was any truth in the statements made they would be even more interesting than they are:

I think it scarcely likely that any one of these newly-arrived Sheffield visitors know anything of a movement that is quietly, and almost secretly, going forward here semi-officially on the part of the Hayes' administration for the modification of the tariff. In conversation the other day with two very prominent New York merchants, one a Democrat, the other a Republican, both greatly respected by the administration, I was



ELLiptical TRUSS WROUGHT IRON BRIDGE.—For Description See Page 1.

of this region, although there are extensive deposits on the east side of the Cumberland River which have been largely worked. As a rule, however, the deposits decrease in size and frequency in going from the Cumberland River toward the east, and, after a few miles' distance from the river is reached, they are scattering and small. The ores are of excellent quality, being almost entirely free from sulphur and containing but a small amount of phosphorus; but they are sometimes mixed with chert and sand. The quality in this respect is as variable as the size of the deposits, the ore in the same deposit frequently showing all degrees of admixture with chert, from a chert breccia to a rich, pure ore, with only an occasional lump of chert inclosed. The average yield of iron from the ore at the furnaces of this region, where it is not very carefully selected previous to roasting, is between 30 and 35 per cent. With careful sorting the yield can be brought much higher, from 40 to 50 per cent. The iron produced from these ores is of a very high grade. There are three active furnaces in this region which use charcoal fuel exclusively for the production of pig iron. From this iron is manufactured the celebrated Hillman's boiler plate, of which it is said by the manufacturers that no boiler constructed of this iron has ever exploded. This iron ranks equal or superior to any other boiler plate manufactured in the United States. It is used largely for steamboat and locomotive boilers, for which latter purpose it finds an extensive market, even as far as the Pacific slope. Considerable ore from this region has been shipped to furnaces at a distance, but within the past two years the depressed condition of the iron market has rendered this unprofitable. This region is well situated as regards transportation facilities, it being drained by the two navigable rivers, the Cumberland and Tennessee, and on the lower border by the Ohio, so that the iron manufactured here can be very cheaply placed in market. The following analyses of two samples of ore from the Suwanee furnace lands, Lyon county, will show the character of the ore from this region. The analyses are by Dr. Peter and Mr. Talbott, of the Kentucky Geological Survey:

No. 1.	No. 2.
Iron peroxide.....	52.926
Alumina.....	4.792
Manganese.....	.210
Lime carbonate.....	.425
Magnesia.....	.355
Phosphoric acid.....	.143
Sulphuric acid.....	30.580
Silica and insoluble silicates.....	10.400
Combined water.....	
Total.....	100.011

Metallic iron..... 37.048

Phosphorus..... .154

Sulphur..... .057

In addition to the great amount of timber available for charcoal, stonecoal in abundance occurs in the same region. This coal is the lowest of the series, and is of most excellent quality, analyses showing it to be far superior to the higher coals of Western Kentucky, which are the ones more generally mined. This region is now more accessible than formerly, as it lies within fifteen miles of the Louisville, Paducah and Southwestern Railroad; but the lack of transportation facilities directly to it has prevented its development. The aggregate amount of ore, coal and timber suitable for charcoal in this region is immense, and it offers great opportunities for development. It is one of the most richly endowed undeveloped iron regions of the State. In many other localities in the Western coal field iron ores have been found, but they have not been thoroughly prospected, and little is known of their extent. One of the best known localities of this sort is in Muhlenburg County. In this county are found, at Airdrie Furnace, on Green River, and at Buckner Furnace, near Greenville, deposits of so-called black band iron ore, a ferruginous bituminous shale, yielding about 30 per cent. of iron. At Airdrie Furnace this ore rests immediately above an excellent coking coal, and the two can be mined together very cheaply. At this place iron can be produced very cheaply by bringing ore from the Cumberland River region and using it in admixture with the native ore. For a more detailed description of this locality see report in the second volume, new series, "Kentucky Geological Reports, on the Airdrie Furnace." The above described localities embrace all the most important iron ore districts of the State. There are numerous ore deposits at other places, some of which have been worked, but, in comparison with the others, to a small extent only. For more detailed information in regard to some of these districts, the reader is referred to the volumes, first series, "Kentucky Geological Reports;" to the "Report on the Geology of the Iron Ores of Greenup, Boyd and Carter counties," in the second volume, second series; to the "Report on the Geology of the Nolin River District," in the second volume, second series; to the "Report on the Geology of the Cumberland River iron region there are many furnace sites unoccupied where iron can be cheaply and profitably manufactured. This region is capable of and destined to a much

assured that the cabinet have under consideration a plan for the appointment of a commission charged with the duty of obtaining information in reference to the action of the present tariff, so that a tariff treaty can be arranged between the principal European countries and America, that shall be satisfactory to all the countries concerned therein. The same authority informs me that the iron, steel and leather trades are to have very prominent and full consideration in reference to these negotiations. I would therefore venture to suggest that it would be well for Sheffield manufacturers to consider who would be the best men among them to put prominently forward, so that the Sheffield trade shall feel that they are properly represented in this commission. It has been suggested to me, by those who know Sheffield well, that Mr. Thomas Jessop would be an eminently proper man for so important a duty. I think it not unlikely that in the course of a week or so I shall be able to give you further details of this administration proposal, and probably to name the New York commissioners who will be chosen as representatives of the American iron and steel interests.

This movement is not a mere scheme founded on political aspirations, but is entirely characteristic of the Hayes' administration. It "means business," and nothing but business. It has been conceived entirely in the interests of the manufacturers of the country. There is marvelous increase of converts to the revenue tariff instead of the protective tariff, and the desire is largely fostered by persons who have hitherto been known only as free traders. Already in New York there has been formed a new trade organization, known as the New York Free Trade Club. Its officers have been selected from men of considerable mercantile and social prominence. Such an organization cannot fail to have an influential control over the counsels of the Hayes' cabinet.

**Nails from old Rails.**—A manufacturer at Wheeling, West Va., is reported to be making a good quality of nails from old rails. Samples were some few days since shown at the office of the Wheeling *Intelligencer*, part of which were made out of rails, pure and simple, and part out of three parts rails and one part muck bar. They are pronounced good, and are smooth and tough and drive well. This process of making nails, we learn, avoids the process of boiling iron. The rails are cut and piled for the heating furnaces, like so much muck bar, and by the use of a flux in the heating process are welded and made as malleable, ductile and close textured in the sheet rolls as so much piled muck. The same paper says, also: "We lately mentioned that Colonel Powell is making nails at the Bellville Mill out of the old rails and one-eighth muck iron, and that he claims to have an advantage equal to \$13 per ton for pig metal. If this turns out to be the case, the furnaces will not have much to do for some time to come, inasmuch as it is estimated that there are enough old rails in the country to run all the mills for several years."

After four years litigation

## The Iron-Masters' Laboratory.

Exclusively for the Analysis of Ores of Iron, Zinc and Manufactured Iron, Steels, Limestone, Clays, Slags & Coal for Practical Metalurgical Purposes.  
No. 339 Walnut Street, Philadelphia.  
J. BLODGET BRITTON.

This Laboratory was established in 1866, at the instance of a number of practical Iron-masters, expressly to afford prompt and reliable information upon the chemical composition of the substances above mentioned, for smelting and refining purposes. The object being to make it at once a convenient, practically useful, and comparatively inexpensive adjunct to the Furnace, Forge and Rolling Mill.

**CHARGES TO IRON WORKS.**  
For determining the per cent. of Pure Iron in an ordinary Ore..... \$4.00  
For the per cent. of Pure Iron, Sulphur and Phosphorus in do..... 12.50  
For each additional constituent of usual occurrence..... 1.50  
For those of unusual occurrence or difficult to determine, the charge must necessarily depend upon circumstances.....  
For determining the per cent. of Sulphur and Phosphorus in Iron or Steel..... 11.00  
For each additional constituent of usual occurrence..... 6.00  
For the per cent. of Carbonate of Lime, and Insoluble Siliceous Matter in a Limestone..... 10.00  
For each additional constituent..... 2.00  
For the per cent. of Water, Volatile Combustible Matter, fixed Carbon, and Ash in Coal..... 12.50  
For determining the constituents of a Clay, Slag, Coke, or of an Ash of Coal the charge will correspond with those for the constituents of an ordinary ore, and the charge must necessarily depend upon circumstances.....  
Printed instructions for obtaining proper average samples for analysis furnished upon application.

**C. C. Harlow & Co.,**  
BRIDGEWATER, MASS.,  
Manufacturers of

**DAMAN**  
Standard Hollow Augers.

Universally acknowledged superior to any other in the market. They have recently been improved, making them, as now offered to the trade, the most perfect tool's of their kind, either in design, material or workmanship.

**Spoke & Dowel Trimmers**  
The very best as well as cheapest.

**Metallic Combination Plow Plane,**  
Made of solid cast steel end of gun metal. Of an entirely new design. Can be used as Groover, Dado and Rabbet Plane, in any direction of the grain and also as a Match Plane.

**Common Sense Door Spring.**  
The most durable and cheapest Door Spring yet made.

**LEAD PIPE CUTTERS.**  
To cut lead pipe in any position and without chips or burrs.

Please send for circulars and prices.

**MEDAL AND PREMIUM**

Awarded to

**T. C. ALCOTT & SON,**  
Mount Holly, N. J.

For their Improved

Turbine Water Wheels.

Territory or right to manufacture for sale.

**GEORGE W. BRUCE,**  
No. 1 Platt St., New York,  
Agent for CLEMENT & MAYNARD,  
Offers his usual unrivaled assortment of Plantation Hoes, and asks particular attention to their Superior Handled Solid shanked Hoe.

Established 1828.

**JOHN P. MOORE'S SONS,**  
Wholesale Gun Dealers

Everything in the line. Eley's Goods. Colt's Revolvers, etc., etc. Bottom prices guaranteed.

300 Broadway, New York.

**Geo. M. Eddy & Co.,**

351 & 353 Clinton Ave., Brooklyn, N. Y.

Manufacturers of

**MEASURING TAPES.**

Of Cotton Linen and Steel.

For all purposes for which Tape Measures are required.

Only manufacturers of

Paine's Patent U. S. Standard Steel

Measuring Tapes,

Pat. Spring Measuring Tapes

of Linen and Steel.

FINE TEMPERED STEEL SPRINGS,

FINE TEMPERED STEEL BAND SAWS,

From 4 inch wide upward. Warranted tougher than any other Hand Saw.

Catalogues on application.

**AN INVENTION WORTH HAVING**  
WINDOW BLINDS OPENED INSIDE  
AND SECURELY FASTENED OPEN OR SHUT  
WITHOUT RAISING THE WINDOW BY USING  
THE HOLBROOK PAT. BLIND HINGE  
FOR DESCRIPTIVE ADDRESS  
THE HOLBROOK PAT. BLIND HINGE  
MANUFACTURED  
WATERTOWN, N. Y.

WANTED

## IRON.

### CLEVELAND ROLLING MILL CO.,

Manufacturers of

**Bessemer Steel & Iron Rails & Fastenings,**

SPRING STEEL AND WIRE of all kinds,

STEEL HORSE SHOES, TIRE, AXLES & other Forgings.

Boiler Plate, Galvanized & Black Sheet Iron, Corrugated Roofing & Siding of Siemens-Martin, Bessemer Steel & Iron.

**CLEVELAND, O.**

Agents for the UNION STEEL SCREW CO.



### ATKINS BROTHERS,

Proprietors of the

### Pottsville Rolling Mills & Pioneer Furnaces

POTTSVILLE, PENNSYLVANIA.

Having introduced New and Improved Machinery into their Rolling Mills, and manufacturing all their iron from the ore, and also doing all Machine Work and Repairs in their own shops, they are enabled to produce

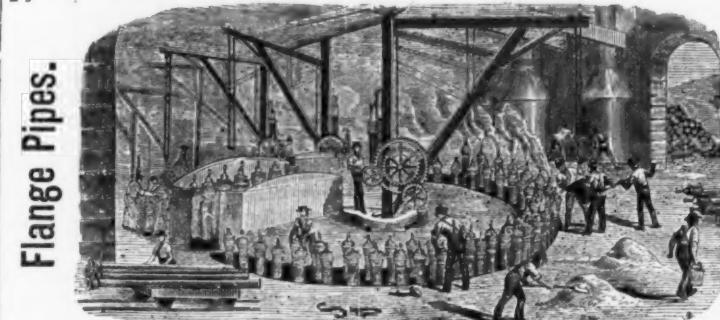
**T and STREET RAILROAD IRON,**

Of all Patterns and of uniform quality, unsurpassed for strength and wear, and of any required length.

Address the Proprietors, Pottsville, Pa.

### McNEALS & ARCHER,

BURLINGTON, N. J.



### CAST IRON PIPES

FOR WATER AND GAS.

### JOHN H. REED & CO.,

IRON MERCHANTS,

And Agents for BAY STATE IRON CO.,

Manufacturers of and Dealers in

Homogeneous Boiler & Fire Box Plates, Plate, Sheet, Pig & Railroad Iron. Wrought Iron Girder, Channel & Deck Beams.

ANGLE and T IRON, BOILER and TANK RIVETS, Lap-Welded Iron Boiler Tubes, Wrought Iron Steam and Gas Pipe.

OFFICES, - - - - 2 Pemberton Square, Boston, Mass.

## IRON FOUNDRY.

ESTABLISHED IN 1840.

### SAMUEL J. CRESWELL, Jr.,

N. E. Cor. Twenty-Third & Cherry Sts.,

PHILADELPHIA.

Iron Fronts, Stairs, Girders, Lintels, Columns, etc.

### THE SWIFT MILL.

ESTABLISHED 1845.

The annexed cut shows one of the many styles of Coffee Mills of our manufacturer, especially adapted to Grocers' use and all retailers of coffee. They are highly ornamental, and workmanship of the very best. We make more than 30 styles.

Also Lane's Portable Coffee Roaster

Will roast 30 to 40 lbs. at once, and can be used as a stove at other times.

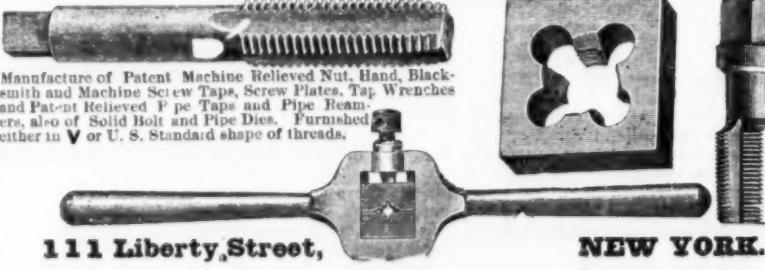
Send for descriptive list to Manufacturers.

**LANE BROS., Millbrook, N. Y.**

Also sold by leading wholesale houses.

### H. S. MANNING & CO.,

Sole Sales Agents for THE MORSE TWIST DRILL AND MACHINE CO.'S



111 Liberty Street,

NEW YORK.

## NEW MODEL SWIVEL VISE.

The advantage claimed for this Vise over the ordinary patterns is in the ease with which it is adjusted to whatever angle may be required.

### Trenton Vise & Tool Works

TRENTON, N. J.

Manufacturers of

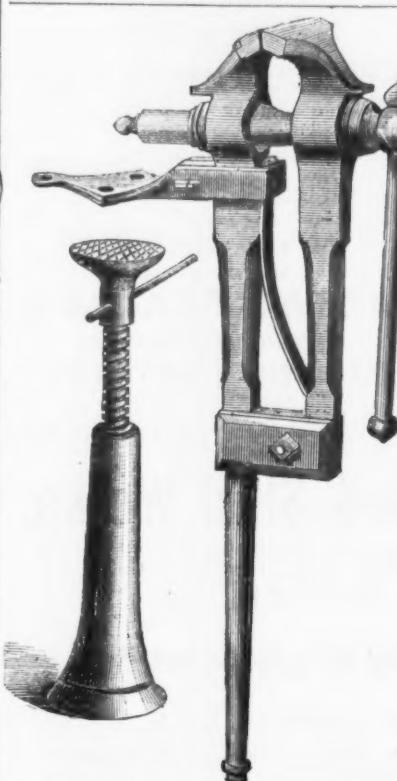
Solid Box Vises, Hammers, Sledges, Picks, Mattocks, Grub Hoes, &c.

Warehouse,

101 & 103 Duane Street, NEW YORK.

### HERMANN BOKER & CO.

Our Vises are warranted to do more work than any other make. No broken boxes or screws.



### WILSON MANUFACTURING COMPANY

NEW LONDON, CONN.,

MANUFACTURERS OF

Composition and Steel Roller Bushings, Fishing Swivels, Coffe Mills, Jack Screws, Turning Lathes, Clamp Heads and Screws; Parallel Bench Vises, Bench Screws, Vise Screws, Box Chisels, Rivets, Sheaves, Block Plugs, Hinges, Screws, Calkers.

Tools, Tackle Blocks and

GENERAL HARDWARE.

OFFICE & WORKS, New London, Conn.

Manufacturers of

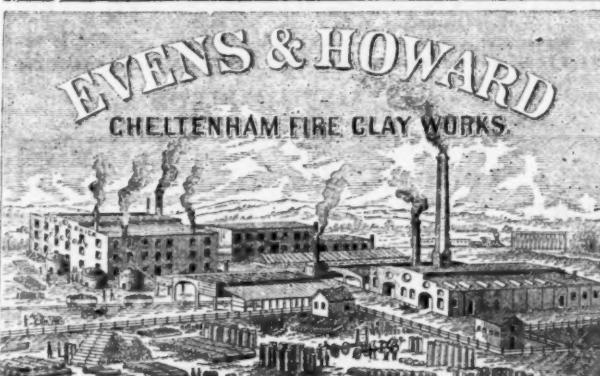
### MALTBY, CURTISS & CO.,

Metal Key Maple & Rosewood FAUCETS.

Also Manufacturers of

Capewell's Giant Nail Puller, THE BUELL PEG FLOAT and the Victor Knife Sharpener.

34 READE ST., N. Y.



EVENS & HOWARD

CHELTENHAM FIRE CLAY WORKS.



The attention of Iron Founders, and those using cupolas of all kinds, is respectfully called to our SILICA BLOCKS for cupola linings, which are superior to any heretofore used for this purpose.

We also furnish Dry Milled Kiln-Dried and Fire Baked Fire Clay.

Ground Fire Brick and Fire Sand to be used as mortar in laying same, the use of which will make a substantial and durable lining.

City Office and Depot, 916, 918, 920 Market Street, ST. LOUIS, MO.

MANUFACTURERS OF

FIRE BRICK, GAS RETORTS, BESSEMER TUYERES, FURNACE LININGS, RETORT SETTINGS of Every Description.

Dry Milled Fire Clay, Fire Sand, Ground Fire Brick in barrels and bulk, Fire Clay Sewer Pipe, Heat Pipe, Chimney Tops, Flue Linings, Drain Tile, &c.

### PERIN & GAFF MFG. CO.,

Cincinnati, OHIO.

MANUFACTURERS OF

Cast Butts, Wrought Butts, Strap and T Hinges, Pulleys, Knobs, Thimble Skeins, Knox and Universal Fluting Machines, Etc., Etc., Etc.

And Jobbers of GENERAL HARDWARE.

OFFICE AND SALESROOMS, 103 W. Pearl Street, Cincinnati, O. FACTORIES, Jeffersonville, IND., Camp Washington, O.

### PHILIP S. BIGLIN.

Successor to W. F. SHATTUCK & CO.,

Manufacturers' Agent for

### AMERICAN HARDWARE.

100 Chambers Sts., New York.

Shattuck's Union and Counter Scales. Phelps's Axe Hatchets, Pick & Hoes, Wellman's Gimlet's, Gimlet Bits, &c. Griswold's Augers, Auger Bits, &c. Holroyd & Co.'s Stocks and Dies. Vawn's "Genuine" Wrought Cow Bells. Barton's Hand and Sleigh Bells. Maltby's Britannia and Cocoa Dippers. "Eagle" Axe Pick and other Handles. "Eureka" Flint, Sand and Emery Papers. Cortland Forged Horse Nails. Tackie Blocks, Spokes, &c., &c.

**W. & B. DOUGLAS,**  
MIDDLETOWN, CONN.

The Oldest and Most Extensive Manufacturers of

**PUMPS,**  
**HYDRAULIC RAMS,**  
**GARDEN ENGINES**  
Yard Hydrants, Street Washers.

AND OTHER

**Hydraulic Machines**  
IN THE  
WORLD.

Awarded the GRAND MEDAL of PROGRESS at WORLDS' EXPOSITION, VIENNA, 1873, being the highest awards on Pumps, &c., also, highest medal at PARIS in 1867, and Philadelphia, 1876, accompanied by Report of Judges.

Descriptive Catalogues and Price Lists sent when requested.

**BRANCH WAREHOUSES,**  
85 & 87 John Street, N. Y.  
AND

197 Lake St., CHICAGO, III.



**UNION MANUFACTURING COMPANY,**

Manufacturers of all styles Plain and Ornamental Butts.

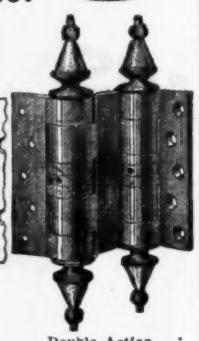
**LOOSE PIN REVERSIBLE,**  
**Cast Fast & Loose**  
Drilled and Wire Jointed.  
Japanned, Figured Enamelled, Nickel Plated  
and Real Bronze Butts. Also a full line of  
**IRON & BRASS PUMPS,**  
Station, Well, and Force Pumps, Yard, Drive  
Well, Garden Engine and Steam Roller Pumps,  
Hydraulic Rams, etc., and all with the most modern  
improvements.



**Centennial Spring Hinges.**

This Hinge has two flat coil springs, very powerful. It has a heavy solid pintal, giving much less friction than a hollow pintal. It has broad shoulders, so that it is less likely to wear down readily and let the door sag. It is Fast Joint, therefore can be used for either right or left hand. By actual test it has an average of 50 per cent. more power than other Spring Hinges in common use of same size.

**Fine Castings a Specialty.**  
NEW BRITAIN, CONN.  
Warehouses,  
98 Chambers St., N. Y.  
67 Kilby St., Boston, (Pumps.)  
Heaton & Denckin, 507 Commerce St., Phila. (Butts.)  
Send for Illustrated Catalogue and  
Price List.



**W. S. BLUNT'S**  
Universal Force Pumps.

Secured by Letters Patent.

**The Largest Pump Works in the World.**  
Over 800 Different Styles.  
**PUMPS, STEAM PUMPS, ROTARY  
PUMPS, CENTRIFUGAL PUMPS,  
PISTON PUMPS,**  
for Tanners, Paper Mills, Fire Purposes, suitable for all  
situations imaginable.



The Oldest Shot Tower in America.  
FOUNDED JULY 4, 1808.



**THOMAS W. SPARKS,**

Manufacturer of  
American Standard Drop and Buck  
Shot and Bar Lead.

121 Walnut Street, Philadelphia.

Premium awarded by the Judges of the Centennial  
International Exposition for uniformity and general  
good finish of Pellets.

Also, HAND FIRE ENGINES.

Send for Catalogue. Address,

**RUMSEY & CO.,**

Seneca Falls, N. Y., U. S. A.

Branch House, 93 Liberty Street, N. Y.

MARCUS C. HAWLEY & CO., San Francisco and  
Sacramento, Cal., General Agents for the Pacific Coast.

**L. M. RUMSEY & CO.,**

Branch House, 511 N. Main St., St. Louis, Mo.

Established in 1836.

**Shelton Company,**

Manufacturers of every variety of

**TACKS & SMALL NAILS,**

Carriage, Machine, Plow, Store and  
Tire Bolts, Coach Screws,

Bed Screws, &c.

BIRMINGHAM, CONN.

Babcock's Sash Fastener,

PATENTED JAN. 11, 1874.

Needs but to be seen to be Appreciated.

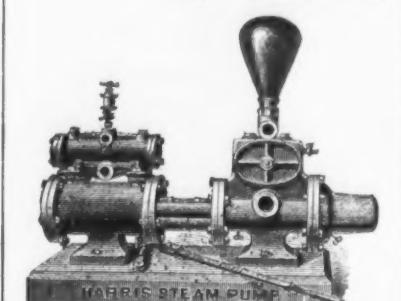
Send for Circular. Sample, &c.

**C. P. BABCOCK, Portland, Me.**

State Rights for Sale.

**Durability secured by  
Simplicity.**

**THE  
HARRIS  
STEAM  
PUMP.**



**A DOUBLE-ACTING  
PLUNGER PUMP,**  
Adapted to every Situation.

**THE  
GREATEST EFFICIENCY  
Coupled with the  
Simplest Mechanism.**

OFFICE OF CROOK'S HOTEL, NEW YORK, Dec. 18, 1876.

READING HYDRAULIC WORKS:

GENTS.—It affords me pleasure to state that the "Harris Steam Pump" furnished by you for my Hotel is fully up to your guarantee, and is a perfect success. It pumps water to the upper story of the Hotel, an elevation of eighty (80) feet, with a steam pressure of less than fifteen (15) pounds; it is perfectly noiseless in operation, and differs from any pump that has been used by me in the same situation, in that it does not "telegraph" on the pipes running through the Hotel, and on that account alone is invaluable.

S. H. CROOK.

HEBREW ORPHAN ASYLUM, NEW YORK, Jan. 9, 1877.

READING HYDRAULIC WORKS:

GENTS.—The Harris Pump purchased of you for supplying water to the tank, does the work to perfection. The pump is located about 200 feet from the boiler and raises the water to the tank, which is 65 feet above the pump. It runs very quietly, and starts just as soon as the steam is turned on. I consider it the best Pump I have ever seen for the purpose.

Yours, &c.,  
D. H. BAAR,  
Sup't of the Hebrew Orphan Asylum, 77th Street and 3d Ave.

Send for illustrated catalogue to

**Reading  
Hydraulic Works.**  
MANUFACTURERS OF THE  
**HARRIS PUMP**

No. 87 Liberty St.,

NEW YORK.

Send for Reduced Price List.

**Japanese Paper Ware.**

Centennial Award

to

**Jennings Bros.**

for the manufacture of the  
Japanese Paperware,  
Water Pails, Chamber and  
Commode do. (Slop Jars,  
Foot Baths and Water Car-  
riers, Bowl and Pitcher,  
Pans, Basins, Cuspidores, Spittoons, &c., &c.)

Warehouse, 379 Pearl St., N. Y. City.

Trade supplied.

New Patents.

We take from the records of the Patent Office in Washington the following specifications of certain patents lately issued, which will be found interesting:

IMPROVEMENT IN PROCESSES OF ANNEALING CASTINGS.

Specification forming part of Letters Patent No. 188,159, dated March 6, 1877, issued to John S. Robinson, of Canandaigua, New York:

This invention relates to a process for the treatment of cannon, shafts, rollers and other castings before removing them from the flasks or molds in which they are cast, such treatment consisting in applying pulverized charcoal, or coal of any other kind, which will be ignited by the heat contained in the casting when such coal is reduced to the requisite degree of fineness, the material to be applied while the casting is at as high a degree of heat as is practicable, or as soon as the sand can be removed from its surface without causing a change of form, the object being to prevent the too rapid cooling of their surfaces and the consequent crystallization and weakening of the metal upon such surfaces. It is a well known fact that when heavy castings, such as ordnance, shafts, or rollers, are made in the usual way, their outer surfaces cool first, and frequently become quite solid in their character while the metal at their centers is still in a plastic or semi-liquid state, and hence it follows that when the central portion cools the tendency

position the flask will be constructed to part at its center, and have upon its ends runnions, one-half of which is upon each of the parts of the flask resting in boxes, formed in suitable stands, so that it may be turned over, the object being to provide for the removal of one part of the mold or the sand in the same, and the supplying of its place with coal, and then to turn it upon its bearings, and repeat the process, the partitions in the flask forming supports for the casting after the mold or the material constituting it has been removed.

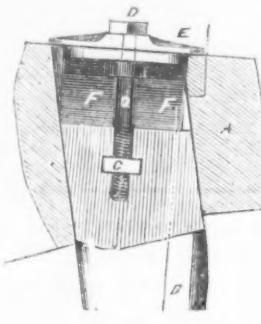
In making castings to be treated by this process it is desirable to form them in what are termed dry sand molds, but the process is not limited to castings thus made, as the molds and the material used in forming them relate rather to convenience in casting than to the invention.

Claim.—The herein described process for treating cannon shafts, rollers and other castings, consisting in the application thereto of pulverized coal before removing them from the positions in which they are cast, and while they are at a red heat.

We take the following abstract of new patents, recently issued, from the official record:

TOOL HANDLE.

To L. H. Roberts, Morley, Mich.—May 22.  
The tool is attached to the handle by means of a slotted wedge having a rabbed cap plate, through which passes a screw bolt provided with a rigid collar, which works in



an enlargement of the slot in the wedge, and a nut loosely fitted in a transverse mortise in the part of the handle which enters the eye. The screw bolt D, having collar G and end nut C, in combination with the handle and wedging device E F.

The following trade-mark was registered during the week ending May 22:

4681.—*Leather Bolting and Lace Leather.*—Charles A. Schieren, Brooklyn, N. Y.

"The representation of a bull's head."

Tests of New Zealand Pig Iron.

The London Iron Trade Exchange says: At the celebrated iron works of the Shelton Bar Iron Company, Stoke-upon-Trent, some very interesting experiments have just been made. They consist of some New Zealand pig iron being worked up and tested. The pigs have been smelted from metallic sands found along the beach of New Plymouth, in Taranki, where the New Zealand Titanic Steel and Iron Company have erected two blast furnaces. Messrs. T. W. & G. Walker, of Wolverhampton, having received some sample pigs, they entrusted them, as stated above, to the Shelton Bar Iron Company to work up and test both puddled and finished bars. This having been done, the Shelton Bar Co. have reported on the result of their experiments. They state that on three of the pigs being broken they exhibited a good mottled fracture.

A Fig. 1 refers to the pit in which the flasks may be placed, they being of such dimensions as may be required for the kind of work to be done, to be parted at their centers. The sections of these flasks may be provided with mechanism, as shown, or with any other that will serve the purpose required, which is the withdrawal thereof from the surfaces of the

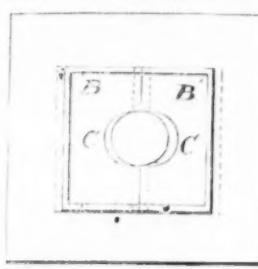


Fig. 2.

castings to such a distance—when the same has become so far cooled as to permit it to be done without a change of form thereof—as to leave a space, C, between it and the inner surfaces of the mold, into which the pulverized coal is to be put, in which position the whole is to remain until the casting is so far cold as to justify its removal. The machinery shown for removing the flasks and the molds from the castings consist of a shaft, r, the upper end of which is secured to the upper surface of the pit, and is furnished with a crank or wheel for turning it, while upon its lower end there is placed a beveled wheel, which meshes into a similar wheel placed upon a horizontal screw, which passes through a nut secured to the flask. This vertical shaft may be extended down so as to carry upon its lower end another wheel similar to the one above described, which shall mesh into a wheel upon a screw placed near the lower end of the flask, or motion may be communicated to the lower screw by means of pulleys and a belt, as shown. The flange upon the lower ends of the sections of the flask may be made to run upon rollers, or they may be slide upon the bottom plates of the pit. For supporting the pattern while in the mold, and the casting after it is formed, it is proposed to place a block of metal in the bottom of the pit, or to place there plates of metal of such dimensions as to answer the purpose, their upper surfaces being large enough to allow a sufficient amount of the mold to rest thereon to prevent the metal from flowing out when the casting is made.

When the articles are cast in a horizontal

position the flask will be constructed to part at its center, and have upon each end runnions, one-half of which is upon each of the parts of the flask resting in boxes, formed in suitable stands, so that it may be turned over, the object being to provide for the removal of one part of the mold or the sand in the same, and the supplying of its place with coal, and then to turn it upon its bearings, and repeat the process, the partitions in the flask forming supports for the casting after the mold or the material constituting it has been removed.

In making castings to be treated by this process it is desirable to form them in what are termed dry sand molds, but the process is not limited to castings thus made, as the molds and the material used in forming them relate rather to convenience in casting than to the invention.

Claim.—The herein described process for treating cannon shafts, rollers and other castings, consisting in the application thereto of pulverized coal before removing them from the positions in which they are cast, and while they are at a red heat.

We take the following abstract of new patents, recently issued, from the official record:

TOOL HANDLE.

To L. H. Roberts, Morley, Mich.—May 22.  
The tool is attached to the handle by means of a slotted wedge having a rabbed cap plate, through which passes a screw bolt provided with a rigid collar, which works in

## USE THE BEST.



Pawtucket, R. I.

The American File Company have the exclusive right to use the Bernot process for cutting files. By this method all the advantages of hand cutting are secured, together with an accuracy unattainable in hand work. They are the only manufacturers who employ machinery for testing files and steel.

Goods of all known manufacturers have been repeatedly tested, and interesting tables have been compiled showing the working qualities of files made by different makers, and of files made from different steels, and with various shapes and angles of tooth. They have thus reduced the manufacture of files to an exactness and perfection with a uniformity of result, as they believe, never before attained. No file, foreign or domestic, that they have ever tested, has equalled the performances of their own goods taken at random from their stock. Their machines are capable of the most delicate adjustment, and can produce the very finest work known to the trade. Special files made to order. Prominent file manufacturers are having their best goods from our works.

Price lists and information furnished on application.

AMERICAN FILE CO., Pawtucket, R. I.

Granted for

After more than Fourteen Years of Competition  
McCaffrey's Philadelphia Hand Cut Files and Rasps  
Have Proved their Great Superiority.

Superior Goods.

McCaffrey's Philadelphia Hand Cut Files and Rasps  
Have Proved their Great Superiority.

Silver Medal.



Messrs. ARNOLD &amp; CO.,

310 California St., San Francisco,

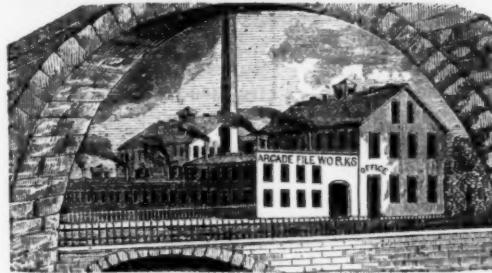
Sole Agents for Pacific Coast.

Highest Premium.



**AUBURN FILE WORKS,**  
Superior Hand-Cut  
**FILES AND RASPS,**  
MADE FROM IMPORTED STEEL. EVERY FILE WARRANTED.  
**FULLER BROS., Sole Agents,**  
89 Chambers and 71 Reade Streets, N. Y.

ESTABLISHED 1848.



**FILES and RASPS**  
Made from Best  
ENGLISH CAST STEEL.  
Quality guaranteed by written warranty  
when required.

**HORSE RASPS AND FILES.**  
We invite the attention  
of the trade to our Celebrated  
American Horse Rasps  
and Files, which are the  
very best American Steel  
all cut by hand, and warranted  
to give entire satisfaction. All Rasps  
and Files not stamped in the  
name and Incorporated  
trade mark are not genuine.  
Sold by Hardware  
dealers generally.

Established 1858.

TRADE MARK.

FILE &amp; RASPS.

HAND-CUT. Manufactured by

JOHNSON &amp; BRO.

No. 1 Commercial Street, Newark, N. J.

Established 1835.

TRADE MARK ON

JOHN ROTHERY

T. M.

MATTEAWAN

N. Y.

John Rothery's

HAND-CUT FILES and RASPS,

Made from English Cast Steel.

JOHN &amp; WILLIAM ROTHERY

Matteawan, N. Y.

Established 1835.

TRADE MARK.

New Pattern

Horse Rasps,

READY FOR DRIVING.

Manufactured from the best of NORWAY Iron.

and warranted to give entire satisfaction.

S. S. PUTNAM &amp; CO.,

NEPONSET, MASS.

LAWN SETTEES

With Bennington.

Hammocks,

Lawn Mowers, Lawn Sprinklers,

Refrigerators, &amp;c.

Send for Price List.

G. WEBSTER PECK,

Manufacturers' Agent,

110 Chambers St., N. Y.

Tackle Blocks

Of all Description.

SHIP BLOCKS,

Well and Ships' PUMPS.

Patent Pressed

PUMP LEATHERS.

Dealer in LICNUMVITÆ WOOD.

JOSEPH THOMPSON,

Factory, 36 Burling Slip, 36 South St., N. Y.

LENNOX &amp; PAIN

Manufacturers of

Iron, Brass &amp; Steel Work.

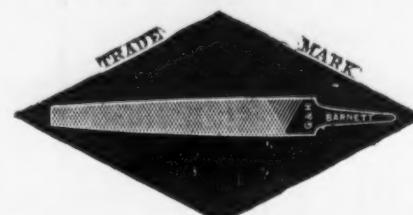
Particular attention paid to Model Making.

Gear cutting for CLOCK WORKS, &amp;c., a specialty.

55 Frankfort St., Cleveland, O.

## Black Diamond File Works.

Send for illustrated Price List.



G. &amp; H. BARNETT,

39, 41 &amp; 43 Richmond St., Philadelphia.

St. Louis, Mo., SEMPLE &amp; BIRGE MFG. CO., Agents.

THOS. TAYLOR, 43 Chambers St., N. Y., Agent for N. Y. and N. E. States.

THOS. JOWITT &amp; SONS, SHEFFIELD,

Manufacturers of every description of

FILES.

Forged, Ground and Cut by  
Hand and Tempered by an  
Improved Process.Manufacturers of  
CAST, SHEAR & BLISTER  
STEEL

For various purposes.

Granted according to Act of Parliament, and Registered in Germany and the United States.

AGENTS: Messrs. Russell &amp; Erwin Mfg. Co., New York and Philadelphia. Messrs. Huntington, Hopkins &amp; Co., San Francisco and Sacramento. Messrs. Quackenbush, Townsend &amp; Co., New York. Messrs. Frothingham &amp; Workman, Montreal.

ESTABLISHED IN 1816.  
NO CONNECTION WITH ANY OTHER HOUSE.

PETER A. FRASSE &amp; CO.,

No. 95 Fulton Street, New York.

AGENTS for the American Screw Co.'s Machine Screws and Taps.

SOLE AGENTS Thos. Turner &amp; Co.'s, Files, Horse Rasps.

" Hubert's French Emery Paper.

IMPORTERS OF STUBS' Files, Tools, Steel Wire.

" " GROBET'S Fine Swiss Finishing Files.

" " VAUTIER, NICOUD and RENARD Gravers.

" " JEWELERS' and Machinists' Supplies.

DEALERS IN Scroll Saw Machines, Bracket Saws, Wood and Patterns.

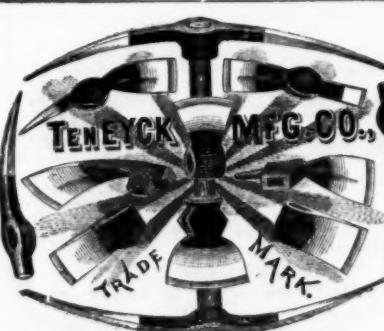
CHARLES B. PAUL,  
Manufacturer of HAND CUT FILES.187 Tenth Street, Williamsburg, New York.  
Established 1863.AUSABLE HORSE NAILS  
POLISHED OR BLUED.  
HAMMERED AND FINISHED

**The Ausable Nails**  
Are Hammered Hot,  
And the Finishing and Pointing are  
Done Cold,

Thus Imitating the Process of Making Nails by Hand.

Quality is Fully Guaranteed.

For Sale by all Leading Iron and Hardware Houses.

ABRAHAM BUSSING, Secretary,  
35 Chambers St., New York.Ten Eyck Axe Mfg. Co.  
COHOES, N. Y.

Warehouse, 103 Chambers St., N. Y.

Manufacturers of

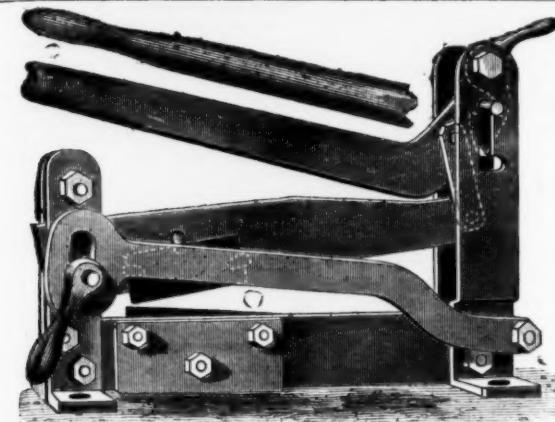
AXES

Of all kinds.

Hatchets, Adzes, Grub Hoes, Mattocks and Picks.

Catalogues and Price Lists furnished upon application.

G. T. DRAPER & CO.  
Manufacturers of SUPERIOR  
HAND CUT  
FILE SINGERS, N. Y.



**PATENT**  
**WROUGHT IRON SHEAR.**

When not in use occupies a space 6x30 inches, and in use the same space with sufficient room to bring down the lever. Weight 180 pounds. Knives have no holes in them, and can be taken out in three minutes. Can be renewed at the mere cost of the steel. One set of knives should last several years. Guaranteed to cut, readily, Iron Bars 4x4, 6x8, 1x1, 1x1/2 square; will also cut Plow Steel.

We offer them at \$20.00 each, with a liberal discount to the trade.

BROWN &amp; CURTISS,

MANUFACTURERS OF

Patented Wrought Iron Wagon Hardware  
SPECIALTIES IN WROUGHT IRON,  
Cleveland, Ohio.

GOLD MEDAL

Non-Extensible Razor Belt.

PATENTED JULY 25, 1871.

RE-ISSUED MAY 13, 1873, and JUNE 9, 1874.

In this Strap the liability of the leather to stretch and become loose and porous is prevented by the use of a patented non-extensible base, which supports the leather and secures

PERMANENT ELASTICITY.

We make this style with single rod, double rod, and wood frames, and intend that it shall, in quality compare favorably with our other well known brands.

BENJAMIN F. BADGER & SON, Manufacturers,  
Badger Place, Charlestown, Mass.

**Hoisting Machinery**  
Manufactured by  
Crane Bros. Mfg. Co.,  
CHICAGO.  
COOKE & BEGGS, Agents, 16 Cortlandt  
Street, New York.

**THE IRON CLAD  
Ice Balance.**  
200, 300, 400 lbs.  
Capacity.  
CORRECT,  
COMPACT  
and  
DURABLE.  
NOT LIABLE TO GET OUT  
OF ORDER.  
Universally Approved  
BY THE  
Ice Companies.  
Manufactured only by  
John Chatillon & Sons,  
39, 91 & 93 Cliff St.,  
NEW YORK.

**DROP FORGINGS**  
AND  
Special Machinery.  
Hardware & Tools and Specialties in Metals  
manufactured to order.  
HULL & BELDEN CO., Danbury, Ct.

**SILVER'S**  
Waste Heat Utilizer and Ventilator.  
Is the problem solved? How to utilize waste heat from chimneys, establishing a system of warming and ventilating, based upon sound philosophy and economy. This apparatus requires less fuel when the room is ventilated than if not ventilated, a feature heretofore unknown in the history of heating appliances. For circulars and illustrations address  
L. B. SILVER, Cleveland, O.



With this machine two men can do the work of six or eight by hand. Since it has become known at the Centennial Exposition it is being sent throughout the world. One party has already given an order for 25 machines.

For machines or agencies address

**W. WEAVER,**  
Phoenixville, Pa.

#### PRIZE MEDALLISTS:

London, 1862; Oporto, 1863; Dublin, 1865; Paris, 1867; Moscow, 1872; Vienna, 1873, and only Award and Medal for Self-Colling Steel Shutters at Centennial Exhibition, Philadelphia, 1876.

**CLARK & CO.,**  
ORIGINAL INVENTORS AND SOLE  
PATENTEES OF  
Noiseless Self-Colling Revolving  
STEEL SHUTTERS,  
FIRE AND BURGLAR PROOF.  
Also Improved

**Rolling Wood Shutters**  
Of various kinds. Clark's Shutters are the best and cheapest in the world. Are fitted to new Tribune Building, Lenox Library, Delaware and Hudson Canal Co.'s Building, Transatlantic Steamship Co.'s new Dock, American News Office, &c., Posey County Court House, Mt. Vernon, Holt County Court, Oregon, Mo. Also to buildings in Boston, Cincinnati, Detroit, Janesville, Wis., Baltimore, Canada, &c. Have been for years in daily use in every principal city throughout Europe, and are endorsed by the **Leading Architects of the World.** Office and Manufactory,  
162 & 164 West 27th Street, N. Y.

#### ANSONIA CORRUGATED STOVE PLATFORM

Manufactured by the  
Ansonia Brass & Copper Co.,  
Office, 19 & 21 Cliff Street,  
NEW YORK.



Cut Showing Round Platform.  
Section Showing Edge.

**ANSONIA**  
Bronzed Fire Screen,  
With Ornamented Moldings.  
PATENT APPLIED FOR.

*The Portable Portable Fire Screen or  
Shield* as shown in the illustration, is especially  
designed for the safety and protection of walls, fur-  
niture, woodwork, paper or varnish from heat.  
Being constructed of metal, with firm and substan-  
tial edges, curved in form to stand alone, it may be  
easily adjusted to any position above a stove, before  
a grate or fire place. The demand for something  
useful, durable and ornamental as a Fire Screen has  
long been felt, and having finally accomplished the  
desired result, we are prepared to fill all orders  
promptly.



**H. A. ROGERS,**  
19 John Street, NEW YORK.  
BOX 4106.

**SUPPLIES, in every variety,**  
For Railroads, Mills and Manufacturers.

Send for new Illustrated Catalogue, 272 pages.

#### THE IMPROVED HOWE SCALES

In Competition with the World, at Philadelphia, 1876.

#### TWO FIRST MEDALS, and TWO DIPLOMAS OF MERIT

The following are the points that the Judges officially announced as the basis of their award of the highest honors to the Howe Scales:

- 1st. For their Protected Bearings (the Howe is the only Scale with protected bearings), which makes the Scale **DURABLY ACCURATE.**
- 2d. For their Strength.
- 3d. For their Simplicity.
- 4th. For their economy in construction.
- 5th. For their first-rate material and workmanship.
- 6th. For their various original improvements and adaptations (which being patented are exclusively possessed by the **HOWE**).

#### The Improved Howe Scales

MADE BY THE

**BRANDON MFG. COMPANY, of Brandon, Vt.,**

Are Guaranteed Superior to all others.

For Plans, Prices and other information, address,

A. M. GILBERT & CO., 95 to 101 Lake St., Chicago, 116 Main St., Cincinnati, 612 N. Third St., St. Louis.  
PACE & CO., - 3 Park Place, New York City. 63 Wood St., Pittsburgh.  
I. S. WILLIAMS, - 213 Market St., Philadelphia.  
PRIEST, PACE & CO., - 145 Franklin St., Boston.  
V. S. W. PARKHURST, Cor. Market & Fremont Sts., San Francisco, Cal.  
FROTHINGHAM & WORKMAN, - Montreal, Canada.

#### G. W. Bradley's Edge Tools.

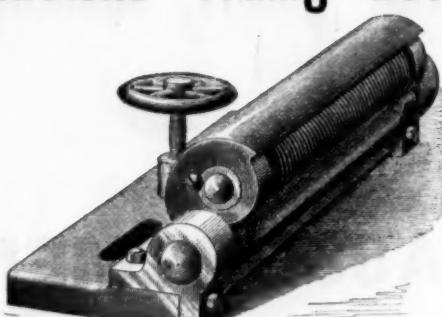
Butchers' Cleavers,  
Butchers' Choppers,  
Axes and Hatchets,  
Grub Hoe and Mattocks,  
Mill Picks  
Box Chisels and Scrapers,  
FOR SALE BY

MARTIN DOSCHER Agent, 96 Chambers Street, N. Y.

#### BROWN & SHARPE MFG. CO.

Providence, R. I.

#### Grindstone Truing Device.



PRICE \$20.00.

One of the most disagreeable things to be done in a workshop is the Truing of Grindstones. It is, therefore, often the case that they are allowed to become quite out of shape and untrue, very much to the annoyance of the workman, who finds it almost impossible to grind his tools in a proper manner. The above cut illustrates a device which is well adapted for truing and keeping the face of grindstones constantly in good shape. This can be instantly applied to the face of the stone, working automatically, without interfering with the constant use of the stone, and does the truing without raising any dust.

#### The Late John Jones.

The *Iron and Coal Trades Review* pays the following tribute to its late editor, John Jones, whose death was announced in our last issue:

It may safely be said that a more widely known man than Mr. John Jones could not be found in connection with the iron trade, not only of the North of England, with which he was specially intimate, but with that of the whole kingdom, and his merits will be fully recognized by all. His face will be greatly missed at Middlesbrough, where he carried on the greater part of his business, and there will be many in that town to say, "we shall never look upon his like again." It will be difficult if not impossible to meet with a man who can conduct such a multifarious business as Mr. Jones had—such a number of kindred societies whose interests were so much bound together. He was a man of such marked ability that the offices which he had held seem to have grown to him, and, undoubtedly, he was peculiarly fitted for them. His administrative faculties—his powers of organization—were shown in the foundation and working, more particularly, of the Iron and Steel Institute. He was certainly the moving spirit and regulator of almost every association appertaining to the great iron trade of the North of England, and it is there that his loss will be most felt. Truly, he can ill be spared.

For eleven years the deceased acted as secretary to the two iron trade associations of the North England—the Cleveland Ironmasters' Association and the North of England Iron Manufacturers' Association. When he assumed the office in 1866, the trade was in a most disorganized condition by reason of the great strike and of the depression in trade generally, and Mr. Jones found his task no light one. However, by his great ability he materially assisted the masters in adjusting their difficulties, and he has ever since proved himself invaluable to them. In 1869 Mr. Jones was one of the foremost in helping to found a board of arbitration for the manufactured iron trade of the North of England, and he ably seconded the efforts of Mr. David Dale, the first president, in making the organization a success. He, from the establishment of the board up to his death, was the secretary of the board on behalf of the employers, the late Mr. Kane acting in the same capacity for the operatives. He held very strong views on the subject of arbitration in wages matters, and spent much time and energy in furthering the scheme, and with so much tact did he conduct his delicate duties on the board, that both employers and workmen will acknowledge that they have lost one of their best friends. The board has been an undoubted success throughout, and strikes have been well nigh unknown of recent years. It was in the year 1869 that the subject of our memoir saw the need for a technical society for the iron and steel trades specially, and he made a suggestion at a meeting at Newcastle-on-Tyne which was heartily responded to, and the Iron and Steel Institute was then and there established, Mr. Jones being appointed secretary. He had very arduous duties to perform in connection with this Institute—as all must who desire to make a new society a success—and he had the satisfaction of seeing the organization become one of the chief technical societies in the kingdom, comprising among its members 1000 persons, some of them the most learned authorities in the trade. Those who have accompanied the Iron and Steel Institute on its provincial excursions will be able to appreciate fully the services of their indefatigable secretary, and to acknowledge that it will be almost impossible to find a man who can fill his place. The *Journal* of the Institute, which he edited, is well known to scientific men all over the world. Another society Mr. Jones was instrumental in founding, and which will ultimately be of much value to the iron trade, is the British Iron Trade Association, which was formally inaugurated last year. The Iron and Steel Institute takes up technical and scientific matters only, and the British Iron Trade Association deals with commercial questions of interest to the iron trade. During the last year the latter association has proved a very useful organization for watching treaty business and bills before Parliament, and has shown the far-sighted judgment of Mr. Jones. Locally the deceased was secretary of the Exchange Company, the Cleveland Club, the Chamber of Commerce, the Freighters' Association, &c., and the fact that these are in a flourishing condition, notwithstanding the bad times, speaks well for his business tact and ability.

Mr. Jones was an accomplished geologist, and was a member of the Geological Society of London. In private life he was one of the best hearted of men, and drew around him a large circle of friends who will deeply deplore his removal from our midst. He was never backward in engaging in any work which would tend to the public good, and those coming in contact with him in business will not be slow to acknowledge his merits. The deceased was connected with several field clubs and literary societies, and he was mainly instrumental in establishing the Tees Valley Field Club. He had literary abilities of no mean order, but his only work in book form, except the *Journal of the Iron and Steel Institute*, was standard book on "The Geology of the South Staffordshire District." Notwithstanding his multifarious duties in connection with the iron trade, Mr. Jones found time not only to conduct this journal, but he also edited the *Middlesbrough News*. His views in political matters were decidedly liberal; nevertheless they were of a tolerant character, and thus he respected the views of those who differed from him in this respect. Altogether, the life of the deceased has been a most hardworking and useful one, and he will undoubtedly leave behind him "footprints on the sands of time."

#### Puddling with Coal Dust.

The *Coal Trade Journal* says: Experiments are being made at the works of the Towanda Iron Manufacturing Company, at Towanda, Pa., with the culm or dust of the Loyal Sock mines. This coal is called a semi-anthracite; it looks very much like the bituminous coal in the vicinity of the works, but lacks the bitumin, is remarkably free

from sulphur, and contains over 90 per cent. of carbon. The first trial made with the culm was under the boilers, and it was quickly demonstrated that more steam could be generated with it than with coarse coal; and not only so, but that it could be done in less time and with a lighter weight of fuel. Experiments were next made in puddling iron. A common double puddling furnace was used, temporary alteration having been made for the purpose. The fire box was lengthened from twelve feet to twenty-one feet, so as to increase the grate surface, this being necessary from the fact that the fire must be kept very thin—not over three inches. The grates were placed close together, and contained numerous small holes, their diameter being about the eighth of an inch. In bar three to four inches wide and two and one-half to three feet long, there would be from 400 to 500 of these holes, and there was about two feet of dead surface between the grate and the bridge wall. These were the only alterations made, the furnace itself not having been changed. The fuel was introduced in the ordinary way, only it was necessary to spread it very evenly over the grate, and a blast was used. The person who is conducting the experiments says he can get up steam and melt iron quicker with this fuel than with any other coal he ever used, and the iron produced is claimed to be of a superior quality, owing to the freedom of the fuel from sulphur. The works are twenty-five or thirty miles from the mines, but the owners of the latter offer to deliver the culm at a price not to exceed eighty-five cents per ton. Further experiments are to be made, and we hope soon to be able to give additional particulars.

#### An Improved Squeezing.

Mr. Jeremiah Head, M. Inst. C. E., communicated the following to the Cleveland Institution of Engineers on the above named subject:

When many years ago, Mr. W. Menelaus, of Dowlaish, was experimenting with his rotary puddling furnace, he gave considerable attention also to the question of how best to consolidate and clear of cinder the large masses of crude wrought iron which were likely to be produced. Having had great experience in squeezing as then performed by the Jerry Brown squeezer, he naturally inclined toward dealing with the iron in that way rather than by hammering. His puddling furnace not being, as he candidly admits, a commercial success, he did not go so far as to construct a squeezer, but still he matured to a great extent his ideas as to what it should be, and made a wooden model embodying these. This model he exhibited at the Middlesbrough meeting of the Iron and Steel Institute. Since that time Mr. Danks' squeezer, which is very different in many respects, has been adopted at certain iron works, and with fairly satisfactory results. Mr. Price, of Woolwich, also has made some valuable experiments to determine the best form of squeezer, and these are understood to be still in progress. Other engineers have been and are at work in the same direction. Among these the writer has given the subject some attention, resulting in the design which was brought before the Cleveland Institution of Engineers at their last meeting. The leading principles of Mr. Menelaus' squeezer had been adhered to, but the details of Mr. Head's machine are new.

The squeezer proper consists essentially of three rolls, two side by side, with a rotary motion only, and the third above, having also a vertical travel of at least 12 in. One of the lower rolls has a collar, and the other grooves to suit. The distance between the collars determines the length of the bloom, and the final position of the top roll determines its diameter. The rolls are suited to blooms weighing about 15 cwt.; but longer or shorter rolls can be introduced for greater or less weights. The upper roll is rather overbalanced, so as to keep it always up against the screws. The chocks containing its bearings are hung on bolts through which two flat bars on edge are threaded. The ends of these are secured by links to four levers pivoted to the standards. Balance weights are strung upon rods at the other ends of these levers until the required counterpoise is obtained. This forms a very compact arrangement, and is free from the objections which attach to placing the balance weights overhead or in pits beneath. The top roll is lowered and raised by means of the right and left-hand worm wheels geared into the worms upon the diagonal shaft, and driven by the quadruple single-acting engine. The arrangement for working screws by power was described fully in the "Proceedings of the Cleveland Institution of Engineers" for December, 1876. Since that time it has been put to work in the forge train at Newport Rolling Mills with complete success. It can be worked by a boy, or by the roller himself. Of the lower rolls, the grooved one is to be of steel to prevent danger of breaking at the grooves. The depth of the collars in the fellow roll is somewhat greater than half the diameter of the finished bloom, so as to prevent any central projection being left. The piece to be squeezed is tipped from a bogie, and the collared roll will itself deliver it forth upon another bogie on the top roll being raised and a crowbar being inserted between the grooved roll and the bloom. The three rolls are driven through ordinary coupling boxes and spindles by three pinions, which, in their turn, are all driven by a small central pinion of steel. The length of the connecting spindles, and consequently the space occupied by the train is determined by the amount of deviation which the upper one can be allowed to make with the horizontal.

The angle of deviation does not exceed what is now regularly at work at the above named mills. The engine driving the squeezer is an inverted one with variable expansion, steam jacketed, and carefully balanced throughout for a high speed. It has a 20 in. cylinder by 20 in. stroke, and is intended to run at 120 revolutions for the train. At the other end of the second motion shaft is a provision for attaching a blooming mill or ordinary forge train. The engine does not reverse, as this is considered unnecessary with steam worked roll screws, for by means of them the pressure can at any time be removed from the bloom under treatment.

# RUSSELL & ERWIN MANUFACTURING COMPANY

**Manufacturers of HARDWARE.**

Factories, NEW BRITAIN, CONNECTICUT, U. S. A.

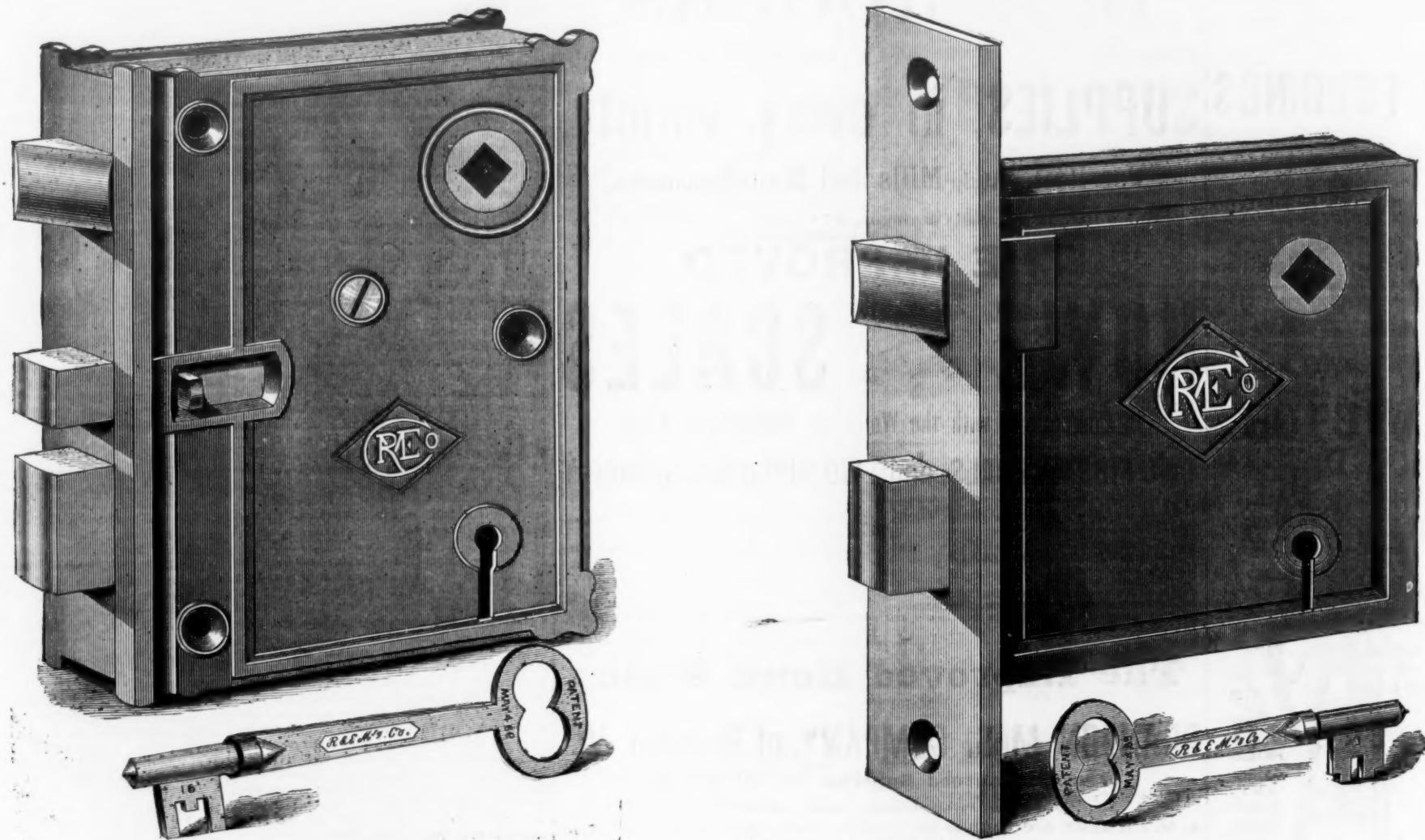
**Manufacturers' Agents and Dealers in General Hardware at our  
WAREHOUSES,**

NEW YORK, Nos. 45 and 47 Chambers Street.

PHILADELPHIA, No. 425 Market Street.

SOUTHERN DEPARTMENT,

BALTIMORE, MD., WM. H. COLE, AGENT, 17 South Charles St.



## RIM AND MORTISE DOOR LOCKS, KNOBS, &c.

Particular attention is called to our

### NEW LIST OF DOOR LOCKS, KNOBS, &c.,

issued under date of July 2d, 1877, showing a large reduction in prices; and also new and complete lines of Rim and Mortise Locks, **WITH OUR PATENT ALL STEEL NICKEL PLATED-KEYS.**

**R. & E. MFG. CO.**

**PRICES REDUCED.**

FLAT HEAD, IRON.  
FLAT HEAD, BRASS.

**ASSORTMENT COMPLETE.**

ROUND HEAD, IRON.  
ROUND HEAD, BRASS.

## Cutlery.

## FRIEDMANN &amp; LAUTERJUNG,



Manufacturers of PEN AND POCKET CUTLERY.

Solid Steel Scissors, Shears, Razors, Russia Leather Straps, Hones, &amp;c.

Sole proprietors of the renowned full concave patent

"ELECTRIC RAZORS,"  
And the "ELECTRIC SHEARS." Nickel Plated Bows.

Agents for the BENGALL RAZORS.

AMERICAN TABLE CUTLERY, BUTCHER KNIVES, &c.  
91 Chambers and 73 Rude Sts., N. Y. 423 N. Fifth St., ST. LOUIS, MO.

## MERIDEN CUTLERY CO



## MANUFACTURE ALL KINDS OF TABLE CUTLERY.

EXCLUSIVE MAKERS OF THE

"PATENT IVORY" OR CELLULOID KNIFE,

The most Durable WHITE HANDLE known. THE OLDEST MANUFACTURERS IN AMERICA. Original Makers of The Hard Rubber Handle.

Always call for "Trade Mark" MERIDEN CUTLERY COMPANY on the blade. Warranted and sold by all Dealers in Cutlery, and by the MERIDEN CUTLERY COMPANY, 49 Chambers Street, New York.



The Miller Bros. Cutlery &amp; U. S. Steel Shear Co.'s "Consolidated."

Centennial Award for best Quality and Finish.



## Pocket Cutlery and Solid Steel Shears and Scissors.

J. C. WILSON &amp; CO., 81 Beckman St., New York Agents.

E. L. COOPER, 48 Warren St., New York Special Agent.

THE MILLER BROS. CUTLERY CO., West Meriden, Conn.

NAUGATUCK CUTLERY CO.,  
Manufacturers of FINE PEN & POCKET CUTLERY.  
FULLER BROS., Sole Agents, 89 Chambers and 71 Rude Sts., N. Y.

## HALL, ELTON &amp; CO.,

Electro Plated Ware, German Silver and Britannia Spoons.



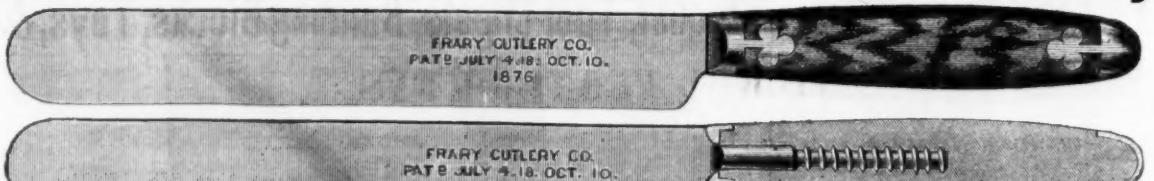
Factories, Wallingford, Conn.

Salesroom, 75 Chambers Street, New York.

## THE FRARY CUTLERY COMPANY,

FACTORY, Bridgeport, Conn. NEW YORK OFFICE &amp; WAREHOUSE, NO. 82 Chambers St.

## Manufacturers of all kinds of Table Cutlery.



The above Illustrations represent their New Patent Screw Tang Lock Solid Handle Knife.

There is no question but that a solid handle knife is much more preferable than a scale tang. The great objection to their use hitherto is, that no solid wood handle has been placed on the market with the handle properly secured—no handle put on with cement will stand the wear and tear of every day usage. The cement will expand and contract with the action of heat and cold, and become loose, crack and come off, causing great prejudice against their use. This objection is overcome in our patent screw tang. A wood screw is welded to the tang of the knife or fork, and screwed firmly and securely in the handle and locked there by the bolster, making a very strong and handsome knife, which we warrant never to get loose, crack or come off. We manufacture a large variety of patterns, both Table, Butchers and Carvers, and furnish the patent handle nearly as low as the scale tang. We are prepared to furnish this line of goods, together with the scale tang and iron handle, very promptly, and very respectfully invite the attention of the trade.

## THE ROGERS CUTLERY CO.,



MANUFACTURERS OF

## Cutlery &amp; Silver Plated Goods.

P. O. Box 204.

HARTFORD, CONN.

Harrison Bros. & Howson,  
SHEFFIELD and LONDON,  
Manufacturers and Importers of

IVORY, PEARL AND STAG

## Table &amp; Pocket Cutlery,

SCISSORS, RAZORS

AND

House Furnishing Goods.

No 26 CLIFF ST., NEW YORK.

W. C. BURKINSHAW, Agent.

## Cutlery.

ESTABLISHED 1852.

NEW YORK KNIFE CO.

MANUFACTURERS OF SUPERIOR

## Table &amp; Pocket Cutlery,

WARRANTED TO BE MADE OF THE BEST  
MATERIAL.

WALKILL RIVER WORKS,

Walden, Orange Co., New York.

THOS. J. BRADLEY, President.

CORPORATE MARK

WALTER SPENCER &amp; CO.,

Steel and File Manufacturers,

Rotherham, ENGLAND.

## Cutlery.

JOSEPH S. FISHER,

No. 411 Commerce St., PHILADELPHIA

AGENT FOR

George Wostenholm &amp; Son,

"Limited."

Washington Works, SHEFFIELD,

Celebrated I-XL Cutlery, Razors, &amp;c

AGENT FOR

WALTER SPENCER &amp; CO.,

Steel and File Manufacturers,

Rotherham, ENGLAND.

CORPORATE MARK

NOSPENCER

ROTHERHAM

Granted 1777.

F. W. HARROLD,

Birmingham and Sheffield,

ENGLAND.

Importer on Commission

OF

HARDWARE, CUTLERY, GUNS, &amp;c.

W. SANDERS, Agent,

76 Rude Street, N. Y.

CORPORATE MARK,

\*

Joseph Rodgers &amp; Sons'

(LIMITED)

CELEBRATED CUTLERY,

No. 82 Chambers Street, New York.

F. &amp; W. CLATWORTHY, Agents.

The demand for Joseph Rodgers &amp; Sons'

productions having considerably increased, they have, in order to meet it, greatly extended their Manufacturing Premises and Steam power.

To distinguish Articles of Joseph Rodgers &amp; Sons' Manufacture, please to see that they bear their Corporate Mark.

VAN WART, SON &amp; CO.

Hardware Commission Merchants,

EXPORTERS AND IMPORTERS,

BIRMINGHAM, - ENGLAND.

Agents,

McCoy &amp; COMPANY,

134 &amp; 136 Duane Street, N. Y.

George H. Gray &amp; Danforth,

48 India Street, Boston.

F. W. TILTON.

17 Old Levee Street, New Orleans.

At each of these places a complete assortment of samples of Hardware and Fancy Goods will be found, including all new descriptions. Sole Agents for

John Rimmer &amp; Son's Celebrated Harness and other Needles.

W. Clark's Genuine Horse Clippers.

Seydel's "Ashante" Pocket Hammock

McCoy &amp; COMPANY,

BORA X A SPECIALTY,

134 &amp; 136 Duane St., New York.

OWEN &amp; CAMPBELL,

Manufacturers of

Pen and Pocket Cutlery.

All blades forged from the best English Cast Steel and warranted. Each knife is made in the most substantial and compact manner, all articles used being of the best quality. Orders filled from the Factory,

10th &amp; Diamond Sts., Philadelphia.

ALFRED H. HILDICK,

12 Warren St., N. Y., Importer of

Birmingham Heavy Hardware, Chains,

Anvils, Vises, &amp;c.

Agency of HILL BROS. &amp; CO., WALSALL, ENGLAND,

GENERAL HARDWARE MERCHANTS,

And of

Ball's Pat. Solid Steel Sheep Shears.

SOLD BY THE HARDWARE TRADE.

DRAW CUT

BUTCHERS' MACHINES.

Choppers, Hand and Power,

Stuffers,

Lard Presses,

Warranted thoroughly made and the best in the world.

MURRAY IRON WORK

Burlington, Iowa

SPECIALTY.

COAL WASHING MACHINES AND

IMPROVED COKE OVENS.

S. DIESCHER,

Civil and Mechanical Engineer,

Cor. Smithfield St. &amp; 6th Ave., Pittsburgh, Pa.

Clinton Wire Cloth,

4 x 6. Square Foot,

A. A. IRVINE,

14 Murray St., New York.

P. O. Box 404.

## Five Hundred Dollars Premium for Utilizing Anthracite Coal Dust.

The American Philosophical Society some years since, offered a premium for the utilization of anthracite coal dust. A committee is now considering the claims of an inventor to the premium. The following letter, which explains the matter, has been sent to various persons interested in similar methods of operation:

JUNE 16, 1877.

My Dear Sir: The American Philosophical Society, of Philadelphia, in the year 1866, offered a premium of \$500 for a process for the successful utilization of anthracite coal dust, to be competed for under the direction of the officers of the society.

A committee is now considering an application for the premium, where the process is burning the material on a perforated grate, with closed ash pit and a steam jet blast, the coal slack being spread thin on the grate, the latter portion of the process being secured to Mr. J. E. Wootten, of the Reading R. R., by a patent. If you desire to secure this premium, and will sign and inclose to me the accompanying application, with evidence and description of your method within three months, I will present the same to the society at their next meeting following its reception, and you will be recognized as a competitor before the committee now considering the subject. Respectfully yours,

ROBERT BRIGGS.

The following is the form for an application to the committee to take notice of an inventor's process:

To the American Philosophical Society: I have been informed that a premium has been offered by the society for the utilization of what is known as coal dust.

Without special reference to such a premium, I have had in operation in that direction a process, and the results are so satisfactory, and I think conclusive, that I desire to submit them to a committee of the society for examination and report thereon.

Should my process be deemed worthy of the premium offered, I shall feel highly honored.

Concerning the above Mr. Briggs says: This offer has been a standing one until the present time, but an applicant for the award having presented himself, the society has now appointed a committee to consider the subject. Applications with evidence and description can be sent to the society at any time during the next three months, until which time the action of the committee will be deferred to allow every method proposed or in use to be properly represented in the competition.

Considering the almost national importance of the utilization of the immense quantity of waste fuel now accumulated and accumulating in the form of dust at the mines, this step of one of the oldest American scientific societies possesses the highest interest, and the premium offered bids fair to bring to publication the various methods now proposed to accomplish the desired result. The accompanying form will serve to give an idea of what is necessary for an application.

**Artificial Fuel.**—An improved fuel has been proposed, consisting of peat dust, 125 parts; slimy deposits of rivers, 10 parts; anthracite dust, 1000 parts; schist oil waste, 100 parts; and dry coal slack, 120 parts. Another improved fuel is suggested by Mr. Malie, consisting of pulverized charcoal waste 80 parts, with 20 parts of pulverized charcoal, which are mixed together, and he then adds 5 parts of nitric acid, 2 parts of nitrate of potash, and 5 parts of gum arabic. The product is considered to be specially adapted for cooking stoves, as it causes neither smoke nor smell. It can be lighted with a match like touchwood, and covered with the other portions of the fuel the combustion continues.

An exchange reports that a Mr. W. H. Lewis, a Welsh gentleman, of Hafod, near Swansea, has invented a new engine of warfare. It consists of a cannon so arranged as to discharge a sharp sword blade crosswise in the direction of the enemy, the knife or cutter being so poised in its career through the air as to cover the whole space in a longitudinal direction described by the blade itself. An 8 inch ball would carry a sword 14 feet in length 600 yards, literally mowing down every human obstacle in its path. This invention is rather too late in the history of modern war to be very valuable. In the time of the Great Frederick, when solid ranks were in fashion, it would have been just the thing, but in these later days, when the ranks are very open, there is less opportunity for such a weapon to be of value. A 14 foot sword in an 8 inch ball is a very respectable weapon, however, but the scabbard seems to us somewhat small.

The Canadian protectionists, though obliged to fight the policy of Great Britain and the influence of the Mother Country in the Dominion, and the opinions of many at home who accept the doctrines and adopt the policy prepared for them, make a steady and able fight, and are constantly raising questions it is difficult to answer. The Toronto *Mail*, premising that the United States has paid three hundred millions of debt in seven years after an exhausting war, and reduced interest from six to four per cent., asks the free traders of the Dominion to explain why it is that the Dominion, having had no war, having enjoyed a semi-free trade tariff on manufactured goods, and almost complete free trade in the produce of the farm and the



Made of Thos. Firth & Sons' Best English Cast Steel.

Full prices and Lists of our other goods furnished on application.

## C. E. JENNINGS & CO.,

Office and Depot for

### J. L'Hommedieu Ship Auger Works,

MANUFACTURERS OF

AUGERS AND AUGER BITS for SHIP BUILDING, BRIDGE BUILDING and RAILROAD USE.

ALSO FOR

### THE BROOKS EDGE TOOL COMPANY,

Manufacturers of Axes, Hatches, Adzes and other Edge Tools.

No. 98 Chambers Street, New York.



All Patterns and Weights in stock at our New York Warehouse.

## CLARK BROTHERS & CO.,

SOLE MANUFACTURERS OF

### Clark's Patent Concave Carriage Bolt.

Best Bolt manufactured for all kinds of Agricultural Machinery. Will not split the wood, and cannot turn in its place.

ALSO MANUFACTURERS OF



MILLDALE, CONN.

## COLEMAN EAGLE BOLT WORKS.

ESTABLISHED 1845.

The Original and Only Establishment Manufacturing the  
Genuine Coleman Eagle Bolt.

Made of Best Quality

SQUARE NORWAY IRON.

## WELSH & LEA,

Successors to M. J. COLEMAN.

WORKS, Columbia Avenue, Hancock and Mascher Sts.,  
OFFICE, 145 Columbia Avenue (Late 2030 Arch St.),  
PHILADELPHIA.

## A Fact. Jobbers & Dealers in CARRIAGE AXLES

Buy Goods of the

Best WARRANTED material  
FOR THE LEAST MONEY OF THE

## CLEVELAND AXLE MFG. CO.

CLEVELAND, OHIO.

Send for Prices and Sample Lot.

## FORT PLAIN SPRING AND AXLE WORKS.



### FOR SPRING TRADE.

All dealers in SPRINGS AND AXLES will find it to their interest to send to us for  
Price List and Discounts.

WOOD, SMITH & CO., Fort Plain, N.Y.

## TO MANUFACTURERS & DEALERS IN SKATES. CAUTION.

A re-issue of letters patent Aug. 18, 1874, No. 154,176, re-issued May 4, 1875, No. 6,410, re-issued Feb. 20, 1877, No. 7,524, application filed Nov. 14, 1876, having been granted to Oliver Edwards, all manufacturers and dealers are notified that they must cease making or selling any skates infringing the same. Special attention is invited to claim 8, "a skate runner having its bottom constructed with a laterally projecting rib and its standards provided with plate supporting brackets, all made in a single piece of metal, substantially as and for the purpose described."

Nearly every cheap, all-metal skate in the market infringes this claim. Manufactured only by the

FLORENCE MACHINE CO., Florence, Mass.

Office and Depot for  
J. L'Hommedieu Ship Auger Works,  
MANUFACTURERS OF  
AUGERS AND AUGER BITS for SHIP BUILDING, BRIDGE BUILDING and RAILROAD USE.  
ALSO FOR

### THE BROOKS EDGE TOOL COMPANY,

Manufacturers of Axes, Hatches, Adzes and other Edge Tools.

No. 98 Chambers Street, New York.

## Philadelphia "STAR" Bolt Works.

NORWAY IRON



FANCY HEAD BOLTS,

Carriage & Tire Bolts. Star Axle Clips, &c.  
TOWNSEND, WILSON & HUBBARD, 2301 Cherry St., Philadelphia, Pa.

TURNED MACHINE SCREWS,  
One-sixteenth to five-eighths diameter.  
Heads and points to sample.  
IRON, STEEL and BRASS.  
Lyon & Fellows Mfg. Co.,  
Cor. 1st and North 3d Streets, Williamsburg, N. Y.

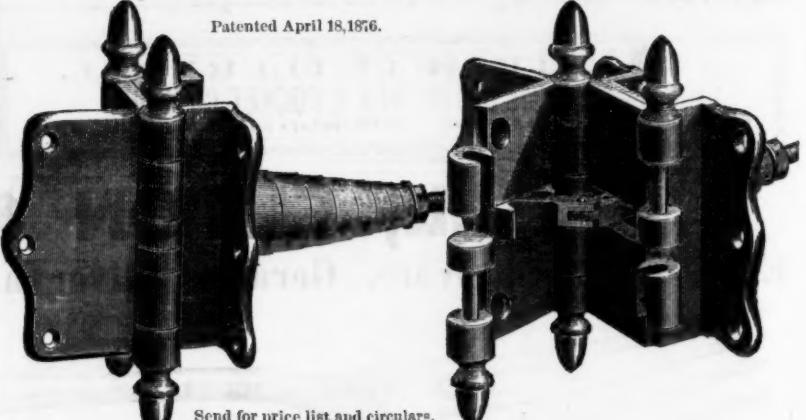
C. R. MOON & CO.,  
Dealers of  
WROUGHT IRON HARDWARE SPECIALTIES FOR WAGONS,  
And all kinds of CARRIAGE AND WAGON MALLEABLES.  
Also Manufacturers of  
MOON'S IMPROVED NECK YOKE.  
The Best and Cheapest in the market.  
Send for Catalogue.  
C. R. MOON & CO., 103 Scranton Ave.

CLEVELAND, OHIO.

WM. GILMOR, of WM.  
MANUFACTURER OF  
Boiler Rivets, Bolts, Railroad and Boat  
Spikes, &c.  
BALTIMORE.

J. BARKER,  
Successor to W. C. BARKER & CO.,  
Iron, Steel, Nails,  
HEAVY HARDWARE, WAGON AND CARRIAGE MATERIAL, DRILLS,  
ANVILS, BELLows, VISES, CHAINS, &c.  
CHICAGO, ILLS.

### PATENT DOUBLE ACTING SPRING BUTTS.



Patented April 18, 1876.

Send for price list and circulars.

### FOR SWINGING DOORS BOTH WAYS.

These Butts are the first ever constructed with two leaves only, and with flanges attached thereto for fastening to the door and ceiling, thus rendering them much more substantial and easy to put on, as the screws are all driven from one side. In the construction of the Butt, the hinge is held firmly in the center of the leaf, so that it is free from all other double acting Butts, and the screws do not become loose, as the strain on them is much less. On the back of the Butt is a powerful yoke spring, and draws in direct line with the center of the door, thus holding the door firmly in position, and obviating all sag. Our price list is from 35 to 40 per cent. lower than others. Manufactured by

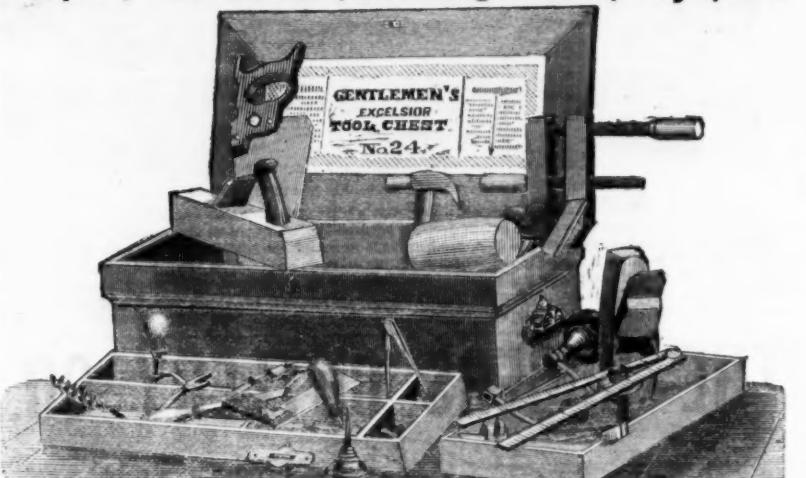
THE SABIN MFG. CO., Montpelier, Vt.

## R. BLISS MFG. CO.,

Pawtucket, R. I.,

MANUFACTURERS OF

Croquet, Tool Chests, Building Blocks, Toys, &c.



We would call the attention of dealers to the following reasons why we can confidently recommend our chest as SUPERIOR to any yet offered to the trade:

First.—They are not filled with a lot of worthless Tools such as the cheap Hoop Iron Planes and Cast Iron Chisels commonly used, but all our Plane Irons, Chisels, Knives, Awls, &c., are warranted all steel.

Second.—Our Boys' and Youths' Chests are not the cheap nailed Boxes commonly used for this purpose, but are made from fine Brown Ash, with Locked Corners, trimmed with Black Walnut Mounting, oiled and varnished.

The Youths' Chests are all furnished with check straps and lifting handles. Our Gent's Chests are made from the finest selections of hard wood, with patent dovetailed joints, fancy paneled covers, oiled and varnished, and are fitted with Lock and Key and Bronze Lifting Handles.

Descriptive lists and prices given on application.

# H. D. SMITH & CO.

Plantsville, Conn.,

Manufacturers of the

## BEST QUALITY CARRIAGE MAKERS' HARDWARE.

Manufacture the Largest Variety of Forged Carriage Irons of Best Material and Workmanship.

PRICES LOW FOR QUALITY OF WORK FURNISHED.

SEND FOR PRICE LIST.

11 Warren Street, N. Y.

HENRY B. NEWHALL,

Agent for the Following Companies.

Lewis, Oliver & Phillips,

Iron Harrow Teeth,

Iron Fluted Wedges,

Iron Crow Bars,

Merchant Bar Iron,

DUCK NEST TUYERE IRONS,

Wagon Hardware, &c., &c.

HENRY B. NEWHALL, 11 Warren St., N. Y.



WM. H. HASKELL & CO.,  
Pawtucket, R. I.

Manufacturers of

COACH SCREWS (with Gimlet Points)

all kinds of

Machine and Plow Bolts,

FORGED SET SCREWS AND TAP BOLTS.

HENRY B. NEWHALL, Agent.

STANDARD NUT CO.,  
Pittsburgh, Pa.

Manufacturers of

HOT PRESSED  
Square & Hexagon Nuts.  
R. R. FISH BARS,  
BOLTS, SPIKES, RIVETS, &c.  
HENRY B. NEWHALL, Agent, 11 Warren Street, N. Y.

Penfield Block Works,  
LOCKPORT, NEW YORK.

Blocks for  
Hay Forks.

Inside Iron  
Strapped Block.

Stiff Swivel Hook  
Block.

Stiff Swivel Hook  
Block.

Sister Hooks and Becketts.

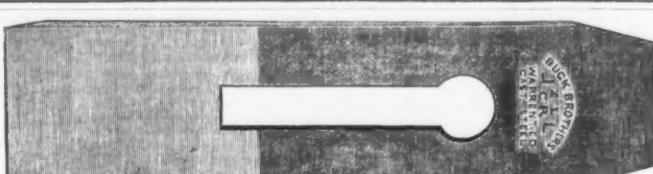
No. 8, Common  
Bushed.

No. 29, Common  
Bushed.

Becket,

HENRY B. NEWHALL, Agent, No. 11 Warren Street, N. Y.

Blocks with Patent Bushings, "All Steel," same price as with Brass Roller Bushings.



BUCK BROTHERS, Millbury, Mass.

The most complete assortment in the U. S. of Shank, Socket Firmer, and Socket Framing Chisels.

PLANE IRONS.

Gongs of all lengths, and circles beveled inside or outside. Nail Sets, Scratch and Belt Awls, Chisel Handles of all kinds. Orders filled promptly; generally same day as received.

The only GENUINE D. R. BARTON Tools

ARE MADE BY

THE D. R. BARTON TOOL CO.,

Cor. Mill and Furnace Streets, ROCHESTER, N. Y.

AGENCIES:

HEATON & DENCKLA, 507 Commerce Street, Philadelphia, Pa.

H. O. STRATTON, 33 Oliver Street, Boston, Mass.

HUNTINGTON, HOPKINS & CO., Sacramento.

NATHAN WEED, 4 Gold Street, New York.



HENRY B. NEWHALL,

Agent for

PROVIDENCE TOOL CO.  
WM. H. HASKELL & CO.  
LEWIS, OLIVER & PHILLIPS.  
ADAMANTINE FILE WORKS.  
PENFIELD BLOCK WORKS.  
ENMET HAMMER CO.  
STANDARD NUT CO.

Double Burner Fairy Queen.



Patented January 2, 1877.  
SAFE, ECONOMICAL, DURABLE, ORNAMENTAL.

This stove embraces in its design and construction all the required elements that ligament and experience could suggest to insure the most durable and lasting fuel economy. The two wicks are fed from two water tanks, which when filled, covers the match and sure stands the water tanks. The water accumulates two important objects: it destroys the disagreeable odor when burning kerosene, and gives additional safety to the oil tank. See for descriptive circular.

C. RIESSNER & CO.,

MANUFACTURERS, 242 Pearl Street, N. Y.

OSBORN M'FG. CO.  
79 TRADE MARK 79  
BLEECKER ST. NEW YORK.



The Original Inventors and Manufacturers of the  
OSBORN BRIGHT METAL CAGES.

Also OSBORN & DRAYTON Improvements under  
twelve different patents. We are continually bringing  
out new and improved designs to meet the demands of  
refinement and taste.

ALVAN DRAYTON, General Agent.



John Maxheimer

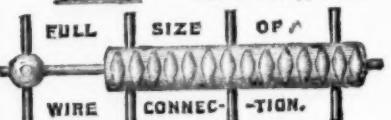
Manufacturer of

Patented  
Bird Cages.

Japanned and two kinds  
of Brass. With or without  
solder.

247 & 249 Pearl St.,  
New York.

Catalogue and price list  
furnished on application.



SCOTT'S  
Standard Bellows



J. CLARK WILSON & CO., Agents,  
586 Water St., N. Y.

Manufacturers of

NEWCOMB BROS.,



# The Iron Age.

New York, Thursday, July 5, 1877.

DAVID WILLIAMS . . . . . Publisher and Proprietor.  
JAMES C. BAYLES . . . . . Editor.  
JOHN S. KING . . . . . Business Manager.

## RATES OF SUBSCRIPTION, INCLUDING POSTAGE.

IN THE UNITED STATES, BRITISH AMERICA  
AND SANDWICH ISLANDS.

Weekly Edition..... \$4.50 a year.  
Issued every THURSDAY morning.

Semi-Monthly Edition..... \$2.30 a year.  
Issued the FIRST and THIRD THURSDAY of every month.

Monthly Edition..... \$1.15 a year.  
Issued the FIRST THURSDAY of every month.

Remittances may be made at our risk by post office money order, draft on a New York or Philadelphia bank, or in a registered letter.

### TO OTHER COUNTRIES.

	Weekly.	Semi-Monthly.	Monthly
Mexico.....	\$6.50	\$3.25	\$1.50
West Indies (all the Antilles).....	6.00	3.00	1.50
South America (ex- cept Brazil and Ven- ezuela).....	8.00	4.00	2.00
Brazil and Venezuela.....	6.50	3.25	1.50
Central America.....	5.00	2.50	1.25
Europe.....	6.00	3.00	1.50
Australasia.....	5.00	2.50	1.25
Asia—India and East Indies.....	8.00	4.00	2.00
Japan.....	6.00	3.00	1.50
China.....	5.00	2.50	1.25
Other Countries.....	6.00	3.00	1.50

### ADVERTISING.

One square (12 lines, one inch), one insertion, \$2.50; one month, \$7.50; three months, \$15.00; six months, \$25.00; one year, \$40.00 payable in advance.

DAVID WILLIAMS, Publisher,  
83 Reade Street, New York.

WESTERN OFFICE,  
77 Fourth Avenue, Pittsburgh.  
JOS. D. WEEKS, Manager and Associate Editor.

PHILADELPHIA OFFICE,  
220 South Fourth Street.  
THOS. HOBSON, Manager.

### BRITISH AGENCY.

The publishers of *The Ironmonger*, 44a Cannon street London, England, will receive orders for subscriptions and advertisements on our regular terms.

### AUSTRALIAN AGENCY.

The American Hardware Company are our agents for Australia. They will exhibit files of *The Iron Age* in the American Building of the International Exhibition, at Sydney, N. S. W., where subscriptions will be received. After the close of the Exhibition, the files may be examined at, and orders for subscription directed to, their office in Melbourne. Sample copies will be mailed by them, free of charge, to any firm engaged in the trades we represent in Australia, Tasmania and New Zealand.

City subscribers will favor upon the Publisher by reporting at this office any delinquency on the part of carriers in delivering *The Iron Age*, also, the loss of any papers for which the carriers are responsible. Our carriers are instructed to deliver papers to subscribers at their residence, and not to throw them in back-ways or upon stairs; and it is our desire and intention to enforce this rule in every instance.

### CONTENTS.

First Page.—New Wrought Iron Bridge Design. The "Perfection" Pipe. The Coal and Iron Resources of Kentucky.

Third Page.—Concerning Some Peculiarities in the Composition of Iron.

Fifth Page.—The Coal and Iron Resources of Kentucky.—(Concluded). News From Abroad About the American Tariff. Nails from Old Rails.

Seventh Page.—New Patents. Tests of New Zealand Pig Iron.

Ninth Page.—The late John Jones. Puddling with Coal Dust. An Improved Squeezing.

Eleventh Page.—Five Hundred Dollars Premium for Utilizing Anthracite Coal Dust. Artificial Fuel.

Fourteenth Page.—The Iron Outlook. Railroads in Europe and America. The Statistical Position of Tin. A Turkish Proclamation of War, Joseph Ferrer de Conto.

Fifteenth Page.—New Publications. Capt. Eads' Report. The Situation and the Outlook in the Iron Trade. New Clock and Bell for Independence Hall. Projectiles and Armor Plates. The Time Ball for New York.

Eighteenth Page.—Industrial Items. Heating Steel for Forging.

Twentieth Page.—Trade Report. Mining Stocks. General Hardware.

Twenty-first Page.—General Hardware.—(Continued).

The second Page.—General Hardware.—(Concluded). British Iron Market. Iron, Metals, Coal.

Twenty-third Page.—Imports. Old Metals, Paper Stock, &c. Philadelphia, Pittsburgh, Boston, Louisville, St. Louis, Cincinnati, Chattanooga, Baltimore, Foreign.

Twenty-fourth Page.—Foreign.—(Concluded). English Letter. Forty-two Inch Car Wheels. New Alloys.

Twenty-eighth Page.—Henry Meiggs. Bessemer Steel Ship Plates. Resolutions of Sympathy. The Pennsylvania Railroad.—Meeting of English Stockholders.

Thirty-first Page.—The Iron Age Directory.

Thirty-fourth Page.—New York Wholesale Prices of Hardware and Metals.

Thirty-fifth Page.—New York Wholesale Prices.—(Concluded).

Forty-first Page.—Philadelphia, Buffalo, Chicago and Pittsburgh Hardware and Metal Prices.

Forty-third Page.—Boston and St. Louis Hardware and Metal Prices.

### The Iron Outlook.

The letter of Mr. W. E. S. Baker, of Philadelphia, which we print elsewhere in this issue, merits the thoughtful consideration of our readers in the iron trades. Mr. Baker is one of the most careful and accurate statisticians of the iron trade, and his tables of cost of production for series of years, published annually in our columns, have become standard authority. Probably no one knows better than Mr. Baker the relation between the average cost of iron and the average selling price, and in pointing out this relation as it exists at this time, Mr. Baker has rendered the trade a service which is none the less valuable because it forces the manufacturer to certain unwelcome conclusions. Mr. Baker believes that, "to avoid widespread ruin to the iron interests and save American labor from pauperism, a large decrease in iron production seems inevitable." This is certainly a safe conclusion to draw from the facts he presents, and one which the ironmaster cannot well escape. The trouble is, however, that each furnace and mill owner would like to have his neighbors stop while he continued running, and as nearly all feel this way, there seems but little probability that many of those now producing will feel inclined to stop until forced to do so by stern necessity. The evils from which the iron trades now suffer are all of a kind which will cure themselves in time; but the remedy is rough, and the sheriff seems to be the one upon whom the task of applying it chiefly devolves. Those who cannot afford to stop making iron to be sold below net cost, are certainly in an unfortunate position. Their course lies between Scylla and Charybdis, and it will require something more than good management to take them safely through the next nine or twelve months. The outlook is certainly gloomy, and the worst feature of it is that there is nothing on which to hang a reasonable hope of recovery. To say it will all come right, sooner or later, is to utter a platitude which cannot do much to revive failing courage, or cure the heart sickness of deferred hope.

### Railroads in Europe and America.

Statistics lately compiled from official sources of the business of the railroads of Europe in 1873, the present statistics of lines in Canada, Spanish America and Brazil, and similar figures of the railroads of this country in 1876, furnish the basis for some very interesting comparisons. The following table shows miles of railroad in operation, population and ratio of mileage to population:

Years.	Countries.	Miles.	Population.	Miles per 100,000 inhabitants.
1873.	United Kingdom.....	16,044	31,900,000	50
1873.	Scandinavia.....	1,915	7,920,000	24
1873.	Russia.....	9,093	66,600,000	14
1873.	Germany.....	13,567	42,100,000	32
1873.	Belgium.....	2,104	5,140,000	41
1873.	France.....	11,565	34,000,000	31
1873.	Switzerland.....	899	2,700,000	336
1873.	Italy.....	2,057	27,500,000	76
1873.	Spain.....	3,419	16,700,000	21
1873.	Denmark.....	385	1,600,000	24
1876.	Chili.....	975	2,068,424	49
1876.	Canada.....	5,129	3,718,745	139
1876.	Mexico.....	639	3,343,470	19
1876.	Argentina.....	397	1,444,000	28
1876.	Uruguay.....	77	536,354	5
1876.	Honduras.....	56	314,000	17
1876.	Costa Rica.....	145	185,000	9
1876.	Colombia.....	64	3,000,000	20
1876.	Venezuela.....	8	1,800,000	36
1876.	Peru.....	1,039	3,199,000	32
1876.	Bolivia.....	76	3,000,000	4
1876.	Argentine Republic.....	1,402	2,100,000	64
1876.	Paraguay.....	45	21,079	23
1876.	Uruguay.....	84	450,000	200
1876.	Brazil.....	7,84	10,700,187	18
1876.	United States.....	73,508	45,000,000	163

As regards the number of miles to the 100,000 inhabitants, it will be seen the United States stand at the head of the list. Next in order is Canada, followed by Uruguay, Costa Rica and the Argentine Republic.

### COST, EARNINGS AND DIVIDENDS.

United States.....	Countries.	Cost in millions of dollars.
3,037	Per mile.	Per mile.
54	447	11
311	186	10
2,519	3,3	5

The above table shows that while the railroad mileage has nearly doubled during the past ten years, the increase in population has been only 23 per cent, the railroads having increased more than four times as rapidly as the population.

The number of inhabitants to a mile of railroad in 1867 was 925, while in 1876 it was only 577. The experience of the New England States demonstrates that to enable railroads to be profitable a population of at least 850 to the mile is necessary.

### ENGLISH RAILROAD STATISTICS SINCE 1870.

Years.	Miles of railway.	Cost in millions of dollars.	Capital stock.	Funded debt.	Freight moved (tons) millions.	Receipts from freights.	Rates per ton.	Miles run by freight trains (millions).	Receipts per mile from ditto.	Gross receipts (millions).	Operating expenses.	Net earnings.	Dividends.	Dividends per centum.
1870.	18,711	16,658	12,151	2,334	817	1,747	1.13	105	\$1,539	\$1,403	2,016	1,371	89	4.21
1871.	19,711	17,576	13,151	2,427	900	1,831	1.13	113	295	333	2,016	1,371	99	4.21
1872.	20,711	18,500	14,151	2,520	990	1,921	1.13	120	305	353	2,016	1,371	109	4.21
1873.	21,711	19,422	15,151	2,613	1,080	2,011	1.13	127	312	371	2,016	1,371	119	4.21
1874.	22,711	20,344	16,151	2,706	1,170	2,101	1.13	134	320	389	2,016	1,371	129	4.21
1875.	23,711	21,266	17,151	2,799	1,260	2,191	1.13	141	328	407	2,016	1,371	139	4.21
1876.	24,711	22,188	18,151	2,892	1,350	2,281	1.13	148	336	425	2,016	1,371	149	4.21
1877.	25,711	23,110												

nail scrap, thereby giving a perfect weld. No puddled iron is used, and the nails do not split in cutting more than those made from all pig iron.

Some dissatisfied spirits among the coal miners of Western Pennsylvania have been trying to form an organization to promote a strike, or at least to demand higher wages, and that means a strike. But the majority did not see the necessity, and hence did not attend, and as a result the last convention incubated the following resolution, which we commend to the careful study of our readers:

*Resolved*, That we hold no more conventions till once they all come out in a body.

In another column we print an interesting letter from Mr. J. Blodgett Britton, of Philadelphia, calling Prof. J. Lawrence Smith to account for announcing as an original discovery some well known facts about the forms in which carbon exists in iron. It is not necessary for us to more than call attention to Mr. Britton's letter.

Experiments are about to be made at some of the glass factories of the West in the use of blast furnace slag for glass manufacture. The slag will be granulated and used somewhat as sand, though the amount of lime it will contain will render it necessary to use less in the glass pots.

#### New Publications.

THE PROGRESSIVE SHIPBUILDER. By John W. Griffiths. Two Vols. Illustrated. 250 pages each.

Mr. Griffiths is among the best known of American ship designers, and his great works upon naval architecture are regarded as authorities everywhere. Since the author's last work appeared he has evidently been vigorously studying the more important problems connected with the construction of ships. We note the fact that in many points his opinions have undergone decided changes within a few years.

At first some of these struck us as strange, but we are inclined to think that he is right and that we were wrong.

The author argues earnestly for a return to the older American models for both sailing vessels and steamers, and says that both greater speed and carrying capacity will result therefrom. While these opinions are exactly the reverse of those common among practical men, and while both English and American practice is tending in exactly the opposite direction, it is of no little satisfaction to find that the experiments of Mr. Froude in England tend to show that the old American practice was right, and that Mr. Griffith's opinions in regard to the proportions of vessels are correct. One sentence in regard to the old clipper models is worth quoting for its significance: "Ship owners made a very great mistake when they dropped the standard of clipper ship speed. Had they but insisted upon holding the speed and increasing the percentage of storage capacity within the same amount of tonnage displacement" \* \* \* American models never would have been superseded. We have not space to speak at any length of the scope of the work, which is both a theoretical and practical treatise on shipbuilding. The work will be found of the greatest interest for the practical builder, the scientific man and the general reader as well.

COAL MINES OF THE WESTERN COAST OF THE UNITED STATES. By W. A. Goodyear. 150 pages. Price, \$1.50.

Mr. Goodyear is a practical mining engineer, and has given us a full and intelligible description of the mines as they exist today. Much useful information is given in regard to the comparative value of the various kinds of coal and their peculiarities. There are a great number of useful tables of tests made with the coals. The results obtained show that the coals are most of them considerably below anthracite in value. The work is mainly the result of the author's own labors and experience.

ART EDUCATION APPLIED TO INDUSTRY. By George Ward Nichols. 200 pages. Illustrated. Price, \$4.

This work is a compilation from various sources. Some of the work can be traced to the Centennial, while a large part is derived from the publications of the Massachusetts and Cincinnati art schools. The illustrations are very good, but some bear little relation to the text; we have, in fact, failed to find any. They are largely from foreign sources, the majority being French. The design for the cover is beautiful, the paper fine and heavy, the typography in every respect sumptuous. In mechanical execution improvement could hardly be suggested. The book forms a very pretty center-table ornament, for which it seems to be very well designed. Under the circumstances it is to be regretted that the author has given evidence of knowing but little of either art or industry, which somewhat detracts from the value of the work as a contribution to standard literature.

#### Capt. Eads' Report.

Capt. Eads has just made a long and comprehensive report to the South Pass Jetty Company, of St. Louis. It covers nearly the whole of the time during which operations have been going on. The results, as stated by Capt. Eads, are as follows:

Our works were begun two years ago in an unused outlet of the Mississippi River, and have necessarily disturbed the regimen governing the outflow to the sea by an enormous volume of water, but the theories upon which they were based have been fully vindicated in the results produced, and it is now manifest that entire and complete success will reward our labors. Among the prominent results developed by our operations are the following:

First.—Concentration of the water flowing across the sand bar at the mouth of the Pass by the jetties created a channel over 200 feet wide, in no place less than 20 feet deep, where only about 8 feet previously existed.

Second.—The concentration of water flowing over a shoal in the river at the head of the Pass created a channel over 400 feet

wide, in no part of it less than 20 feet deep, where but 14 or 15 feet previously existed.

Third.—During the time in which a portion of the flow into the Pass was interrupted by the works at its head, and the current consequently slackened, a temporary deposit took place in the passes between the jetties.

Fourth.—The gradual restoration of the normal flow into the Pass through the new channel at its head, has already begun to enlarge the Pass again, and has, since this restored flow commenced, removed from between the jetties, within the past three months, over 500,000 cubic yards of deposit, and given through more than half the length of the jetties much larger and deeper channel than ever previously existed, the size of which is already throughout more than 2000 feet, 28 feet by 300 feet, or that required to entitle us to the fifth payment from the United States, while many hundred feet of it exceeds 30 feet by 350 feet.

Fifth.—The Gulf current athwart the jetties at the mouth of the Pass effectually prevents reformation of the bar in advance of the jetties by deepening the outer slope of the bar, and sweeps away any such portion of the discharged sediment as the river current fails to carry to unknown distances seaward.

Sixth.—The Mississippi River at the head of the Pass, and where it has a width of over 9000 feet is brought, under complete control by our works, which are so designed as to enable us to increase or limit the discharge into our pass, if hereafter necessary, with but little additional outlay.

Seventh.—Finally, I may add with absolute certainty that this entire system of works is now so far completed that no financial difficulties can intervene to arrest the process of nature which is continually operating to enlarge and perfect the desired channel through them.

#### The Situation and the Outlook in the Iron Trade.

PHILADELPHIA, JUNE 30, 1877.

To the Editor of *The Iron Age*.—DEAR SIR: There are many ironmasters whose cost of pig iron exceeds that given in the inclosed table; otherwise two-thirds of the blast furnaces of the country would not be standing idle. A few favorably located furnaces, where no adequate charge for the value of materials used, or allowance for contingencies is made, may produce iron temporarily below these figures. Others have richer, but more expensive ores and dearer coal. Still others, both furnace and rolling mill owners, are unwilling or unable to suspend operations, but continue to make and throw pig iron upon a demoralized market, vainly hoping that their average cost for the year will not exceed the average of their sales until the sheriff exposes their defective financing.

CENTRAL PENNSYLVANIA.

Averages of cost for best qualities of iron.

PIG IRON.
Fossil ores (chiefly) and waste and freight from mine, tons, 2.1, 1.25, per ton pig..... \$7.69
Coal, tons, 1.14, 1.23 per ton pig..... 4.93
Limestone, 14.02..... 5.81
Labor..... 2.02
General contingencies, renewals, repairs, taxes, salaries, insurance and all sundries..... 1.65
Cost 6000 tons per year product, average quality..... \$17.10
Add interest on capital invested per ton..... 1.26
Average cost furnace bank..... \$18.36

REFINED MERCHANT BARS.

Pig iron (best) and scrap and waste and freight from furnaces, ton, 1.30, 1.13, per ton bars..... \$21.93
Coal and waste, ton, 1.9, 2.27, per ton bars..... 5.89
Labor..... 12.92
Puddling ores, salaries, renewals, repairs, taxes, insurance and all contingencies..... 4.62
Cost 6000 tons product per year, average size and best refined bars and rods..... \$45.37
Add interest on capital invested, per ton..... 1.15
Average cost mill yard..... \$46.72

NAILS AND SPIKES.

Plate iron..... 1.97
Labor per keg, all sizes average..... .41
Keg, empty..... .10
Coal for heating and fueling, &c. .... .03
Salaries, renewals, repairs, taxes and all sundries..... .05
Cost 50,000 kegs a year, average size..... \$2.65
Interest on capital..... .05
Average cost at factory..... \$2.65

The present cost is unquestionably higher than pig iron, bar iron or nails will realize, as your market reports plainly show. And while the higher grades of pig iron, and extra sizes of bars and nails increase the average price above the quoted base, the freights, selling charges, bad debts, &c., more than absorb the amount realized from the extras, and it requires no argument to prove that cost exceeds price.

The exportation of our surplus pig and bar iron is the remedy proposed by many, but they do not consider that in order profitably to export iron we must, in foreign markets, meet the price of all other competing nations. Our home price is ruinously low, and it is hardly conceivable wherein the cost can be further reduced, and yet, owing to their still cheaper labor (which borders upon degeneration), iron can be bought in England and Belgium some 15 to 20 per cent. lower, while all these points of the globe at figures no greater than from American ports. The exportation of American iron may be an important feature of the future iron markets, but it is not appreciable at present, as the total exports of pig and bar iron from the United States in 1876, would not have kept one furnace and mill in operation for three months. This gives us a rate of three one-hundredths of a second per rate. During the two months there were some heavy storms. Careful observation failed to show any error from that cause. The placing of the bell interrupted the working, but the rate, to the present month, was thereafter uniformly maintained.

I ascertain the rate of the clock by solar and sidereal observations with a very superior four feet astronomical transit instrument three times per week, when the condition of the weather is favorable.

A dial and hands, connected by telegraphic communication with the clock, show each vibration of the pendulum at the place of observation. For variations of temperature, I have added to this steel and zinc compensation pendulum a mercurial auxiliary compensation, which adjusts for very small variations of temperature. By a secondary regulator, I can regulate for the fraction of a second. The clock strikes at the 60 second at each hour of the day, according to the mode adopted on the Westminster clock. The first stroke of the hammer is at Philadelphia mean time, longitude of the State House. An interval of four seconds elapses between each stroke of the

influence may be mentioned—the increasing use of Bessemer steel. If a steel rail or tire lasts four or five times longer than one made of iron, and costs but a trifle more, it is apparent that much less pig iron will be required for wrought iron after the use of steel becomes general. The cost of making Bessemer steel has been reduced nearly down to the cost of wrought iron, and steel and iron may soon be uniform in cost and in price, when bars, rails, boilers, girders, girders, &c., will probably be made from Bessemer steel in preference to wrought iron, and be cheaper and more enduring.

The universal shrinkage of values has brought bankruptcy to thousands, and few have escaped detriment in principal or income. It has seriously affected the wages of labor, especially that employed in the iron and coal regions, where ordinary labor seems to be at the minimum (sixty to eighty cents a day); and while wages differ in various localities and need equalizing, there is no room for a general reduction, except in certain grades of skilled labor, which must yield to necessity.

Ample reward for labor is a sure indication of the prosperity of a country, just as insufficient pay, which reduces the comforts and restricts the privileges of the workmen, also causes a scarcity of money and stagnation of business, because the toiling masses have nothing to spend beyond what will purchase the plainest necessities. At the same time, capital refuses to invest in unpromising enterprises. If we degrade labor, capital suffers with it. At this time thousands of working people are idle and millions of capital unproductive. Give both remunerative employment and "hard times" in general business will cease; but even that will not correct the serious blunder of multiplying iron works in advance of the requirements of the country, and in localities distant from materials and from a market, and against the laws of trade and of common sense. To avert widespread ruin to the iron interest and save American labor from pauperism, a large decrease in iron production seems inevitable.

Very respectfully, &c.,

WILLIAM E. S. BAKER.

#### New Clock and Bell for Independence Hall.

The Philadelphia *Ledger* gives the following very interesting particulars in regard to the clock in Independence Hall:

The new clock in the tower of Independence Hall was built by the Seth Thomas Clock Company, of Thomaston, Conn., and runs eight days with one winding. The frame stands eight feet high, is of cast iron, and, with running gear complete, weighs 6000 pounds. A tablet fastened on its middle panel bears this inscription: "Presented to the City of Philadelphia July the 4th, 1876, by a citizen, also manufactured by the above-named company, superintended by William E. Harpur, of Philadelphia. The main bed, on which the strike posts are placed, is 9½ feet long by 3½ wide, and 10 inches deep, and weighs 1300 pounds, standing 3½ feet from the floor. The strike barrels are 23 inches in diameter by 20 long. The two driving wheels are bronze, 47 inches, and hold on their sides 18 steel lifting cams, which act on a lever to raise the hammer. They have 162 teeth connecting them by intermediate shafts to the rack and snail, which governs the striking of the hours, and also with a fan which regulates the strike. This is placed in the middle of the frame. The fan arms measure about 3 feet from center of shaft, and hold a vane made of thin brass 0.18 inches. The main wheel is 2 feet, and this, with the heavy parts of the time train, rest on another bed 4½ x 3½ feet, and 7 inches deep, raised above the main bed by stands 9 inches high; an arched frame, spanned by a strong girt, for the support of the pendulum, also rests upon this bed; this, with a girt, crosses the frame and carries the lighter parts of the train with the dial connection. The dials are four, 9 feet in diameter and having gilt numerals. The shafts are all of steel, and run upon bell metal boxes. A delicate trip arrangement makes the strike of the hours exact in time. A Dennison double three-legged gravity escapement is placed in full view on the front of the arched or upright frame and having a 12-inch escape wheel with 24-inch pulleys. These, as all the wheels of the time and strike trains, are of bronze. The pendulum is a cast steel compensation rod carrying a iron ball of 500 lbs., the rod and ball weighing together 700 lbs.

The clock thus described is a remarkably accurate time keeper, as the following letter from Mr. Harpur shows, he being entirely familiar with the performance of the clock and also with the construction, about which he was in consultation with the builders:

Henry Seybert, Esq.—DEAR SIR: In compliance with your request, I herewith send you a statement of the performance of the new clock in the State House. The clock after being regulated, was set on the first day of December, 1876. During that month its whole amount of error was one second gain. For the month of January, 1877, its whole amount of error was one second gain. This gives us a rate of three one-hundredths of a second per rate. During the two months there were some heavy storms. Careful observation failed to show any error from that cause. The placing of the bell interrupted the working, but the rate, to the present month, was thereafter uniformly maintained.

I ascertain the rate of the clock by solar and sidereal observations with a very superior four feet astronomical transit instrument three times per week, when the condition of the weather is favorable.

A dial and hands, connected by telegraphic communication with the clock, show each vibration of the pendulum at the place of observation. For variations of temperature, I have added to this steel and zinc compensation pendulum a mercurial auxiliary compensation, which adjusts for very small variations of temperature. By a secondary regulator, I can regulate for the fraction of a second. The clock strikes at the 60 second at each hour of the day, according to the mode adopted on the Westminster clock. The first stroke of the hammer is at Philadelphia mean time, longitude of the State House. An interval of four seconds elapses between each stroke of the

hammer and the succeeding one, which gives 44 seconds at the last stroke of 12.

In comparing watches, allow one second for loss on transmission of sound for every 1100 feet from the State House.

Respectfully, WM. E. HARPUR,  
407 Chestnut st., Sup't of the clock.

June 30, 1877.

Since the placing of the present bell the Councils authorized Mr. Seybert to place the old Liberty bell in the tower of the State House. It is suspended from the second floor by a chain composed of thirteen bronze links, emblematic of the thirteen original States. The new bell is designed to keep in remembrance the grand era of peace and unity in which it was cast and placed in position, which is fully expressed in the Scriptural verse crowning the bell, "Glory to God in the highest, and on earth peace, good will toward men," while the old bell keeps in remembrance the era of the Revolution and the foundation of our liberties. The Councils, by their late resolution, have inaugurated an observance which it is proposed to have continued by the successors of the present generation during the century. At midnight, 3d of July, the new bell will be struck 100 strokes, in remembrance of the past century, and after a pause, one stroke, to mark the first year of the second century of our independence. At noon on the 4th, one stroke for each of the thirty-eight States, and after a pause, one for each of the nine Territories in the Union.

#### Projectiles and Armor Plates.

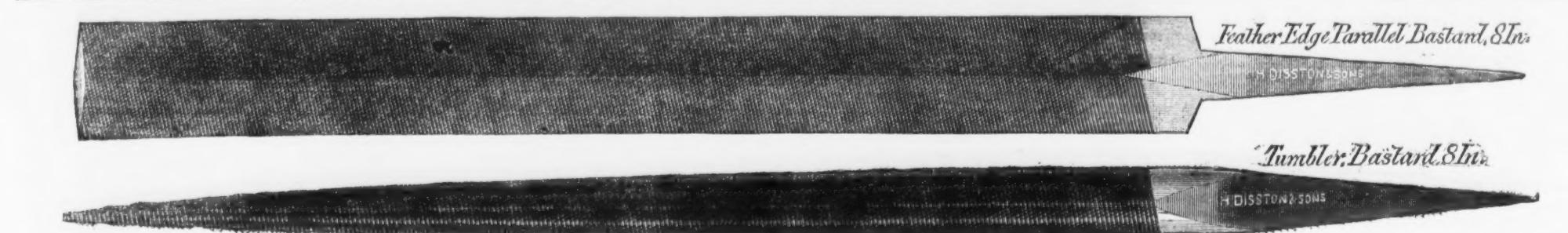
We take the following from the London Times:

Although the power of a gun designed to attack armor is generally measured by the energy with which the weapon sends forth its projectile, its efficiency depends very materially on what may be termed the efficiency of the projectile itself. Under certain conditions, some very singular results have lately shown themselves, and are exciting considerable attention among artillerists. We do not mean to say that the results are absolutely novel, facts of the same kind having been noted as far back as 1870, and placed on record by Colonel Inglis, of the Royal Engineers; but the later experiments are more especially remarkable, and have an aspect of peculiar importance.

The class of facts to which we are about to advert are those which arise when Palliser projectiles are fired against armor plates with void spaces between them. In the first place, an 800 pound Palliser projectile was fired from a 12½ inch unchambered 38 ton gun, the charge being 130 pounds of 1.5 inch cubical powder, and the gun being directed against a 10 inch unbacked armor plate, behind which, at a distance of about 8 feet, was a 4 inch plate resting against an old target. The first plate suffered clean penetration, but the projectile entirely failed to penetrate the second plate. If the shot had simply flown into fragments, the incident would have been less remarkable, as this effect would have indicated that the first plate had shivered the projectile to pieces. But, although the shot was to a great extent shattered, there appeared on the face of the second plate what must be called a "dab" of iron, as if metal had molten had been flung there. The quantity thus deposited was but small compared with the entire bulk of the shot, but its appearance was suggestive of some very interesting considerations. There was also the startling fact that 14 inches of iron had thus baffled the armor-piercing shell, whereas a round fired under precisely similar conditions against a solid built-up target was accompanied by a penetration of three 6½ inch plates and two intervening backings of teak, each 5 inches thick. Thus, in the one case, 193 inches of armor were pierced, and in the other case little more was effected than the penetration of 10 inches.

Another experiment followed, with yet more marked results. A 4 inch plate was put up in front of a 10 inch plate, with an intervening open space of 4 feet 7 inches. The charge on this occasion was fired from the chambered 38 ton gun, and consisted of 175 pounds of 1.5 inches cubical powder, with the 800 pound Palliser projectile, the latter having the same velocity as when fired with 130 pounds of powder from the unchambered gun. The shot went through the first plate, the aperture in front being perfectly circular, and having the same diameter as the bore of the gun. At the rear of the plate the area of injury was 19 inches by 20 inches. On the face of the 10 inch plate there appeared a large splash of metal projecting 4 inches from the plate, and firmly incorporated with it. The diameter of this "dab" was at least a foot, and there were lines several inches in length radiating from it, along which the spattered metal had cut its way into the surface of the plate, creating shallow grooves. The only damage visible at the rear of the plate was a slight bending outward, to the extent of about three-quarters of an inch. Thus the 4 inch plate furnished an efficient protection to a 10 inch plate against a projectile which had been proved to possess the power of penetrating the whole series of three well-backed 6½ inch plates.

The question arises whether the damage done to the Palliser projectile occurs as it passes through the first plate, or at the moment of its impact with the second. When one of these projectiles penetrates armor, and the power of the shot is considerably in excess of the resistance offered by the plate, it not unfrequently happens that the projectile is recovered in a sound and uninjured condition. It is not at all unlikely that the 800 pound armor-piercing projectile, going through a 4 inch plate at a short range, would often be found intact, if nothing intervened to give it a violent shock after passing through that thickness of armor. Some significance also attaches to the fact that when a Palliser shell penetrates two or three plates of a sandwich target, and lodges against the third or fourth, the projectile sometimes suffers but little damage. The fore part of the shot generally holds well together, and the head never makes a "dab" on the final plate, but mostly retains a remarkably perfect point. Also, when a Palliser projectile protrudes at the rear of a single armor plate, the point is often seen to be nearly or quite as perfect as when the shot was first put into the gun.



# HENRY DISSTON & SONS FILE CO.,

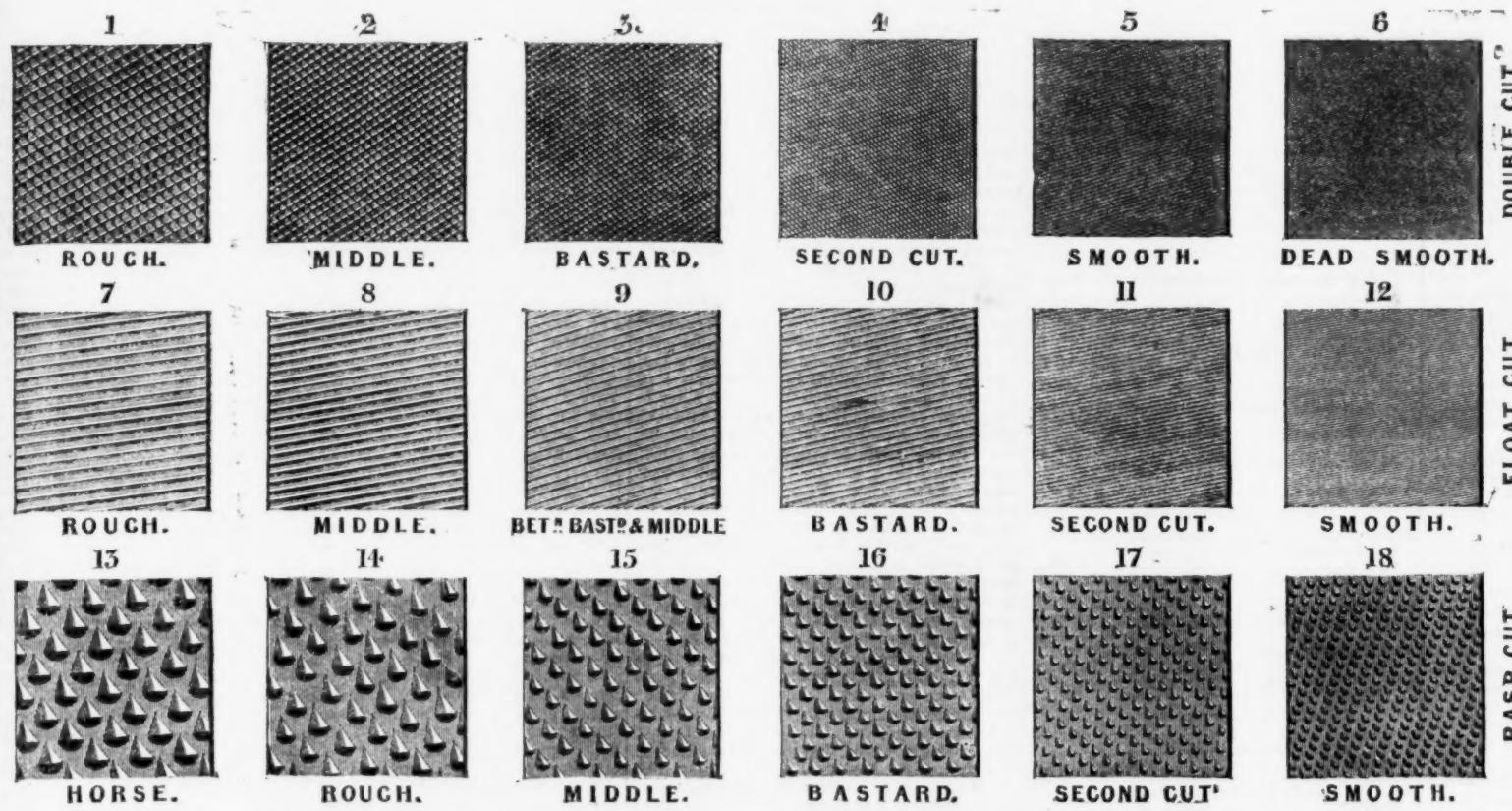
LIMITED,

Manufacturers of every description of

## FILES AND RASPS.

Factory, - - - Tacony, Pa.

Office, Front and Laurel Sts., Philadelphia.



Gulleting File, 6 In.

Three Square Blunt File, 5 In.

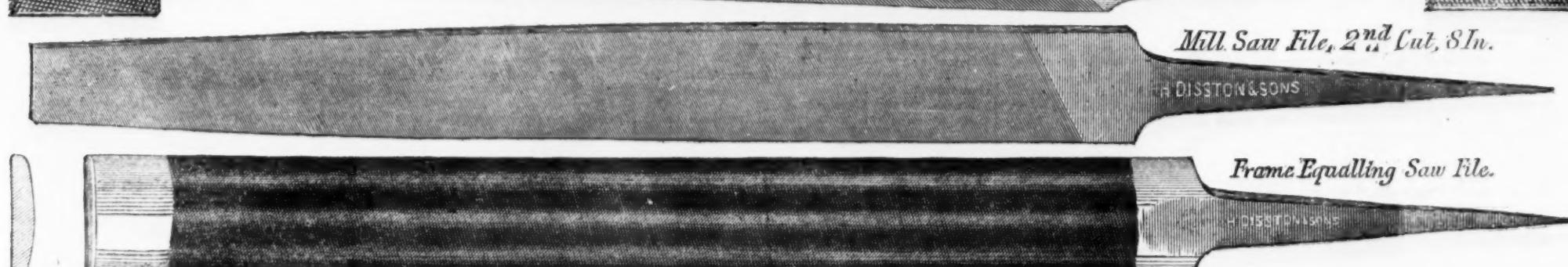
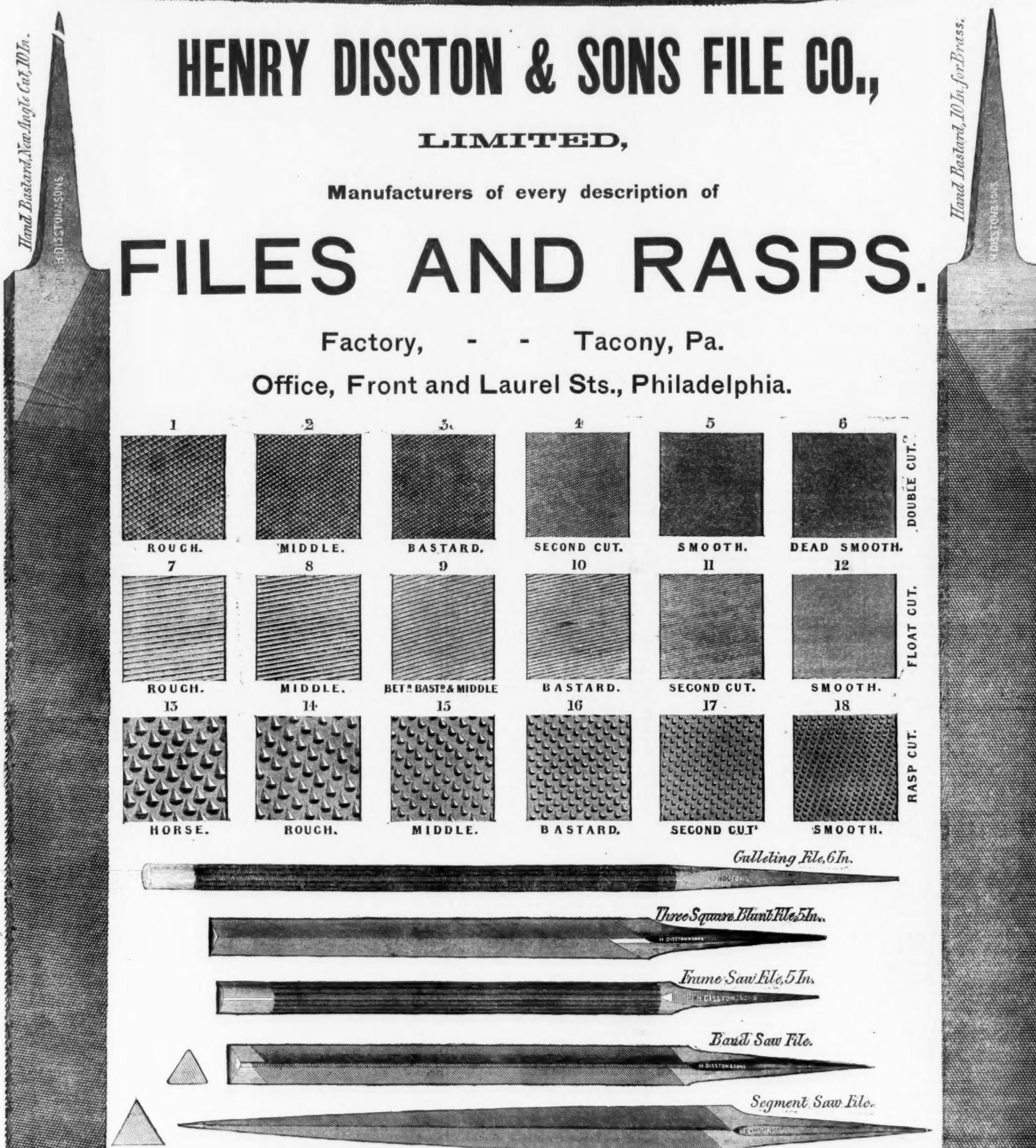
Inine Saw File, 5 In.

Band Saw File.

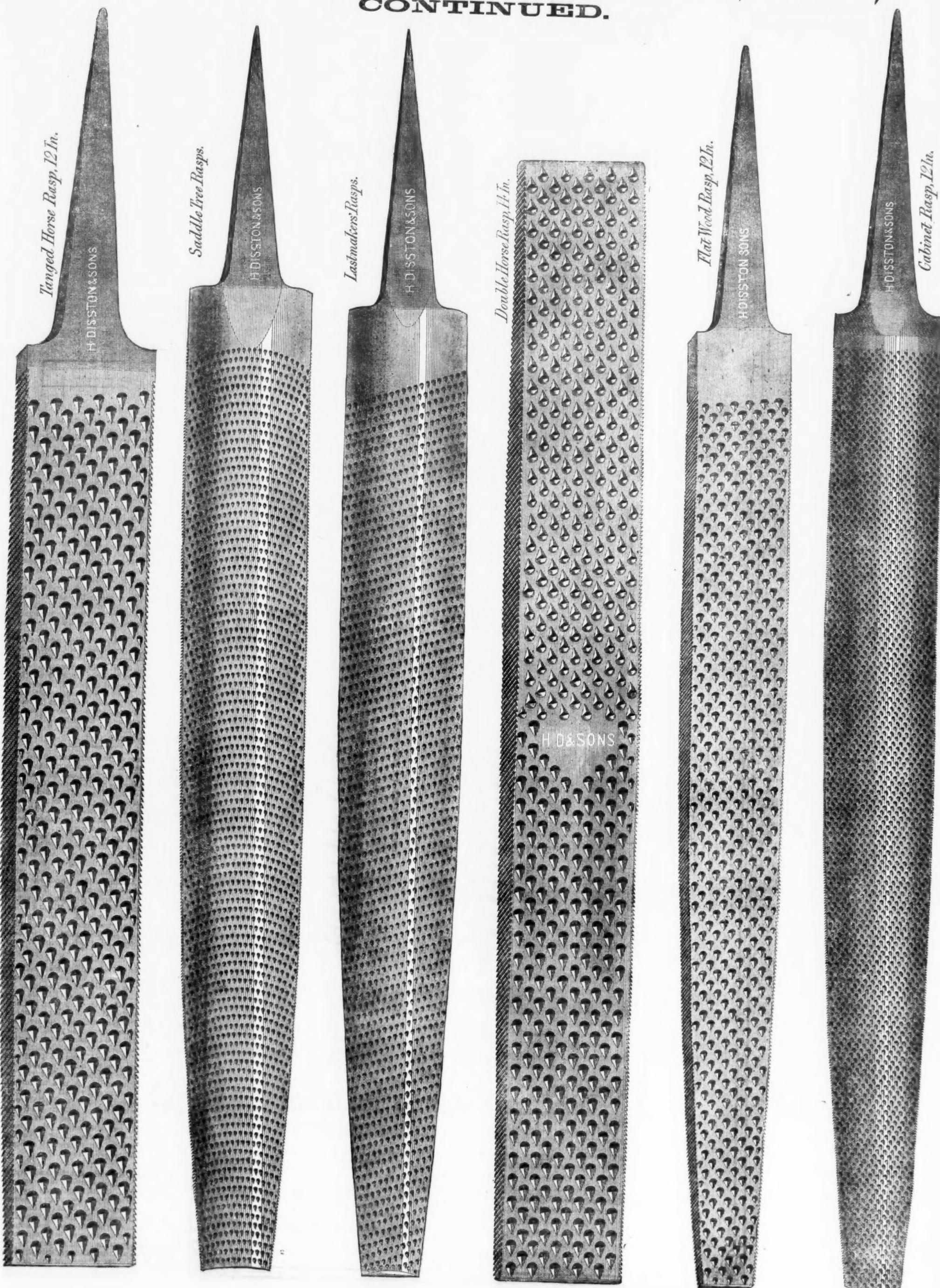
Segment Saw File.

Mill Saw File, 2<sup>nd</sup> Cut, 8 In.

Frame Equalising Saw File.



# HENRY DISSTON & SONS FILE COMPANY, Limited, CONTINUED.



## INDUSTRIAL ITEMS.

## NEW YORK.

The Aetna Iron Works on Goerck street, established in 1840 by Mr. John Roach, have been reorganized under the style of the Aetna Iron Company, with Mr. William J. Fryer as manager. Mr. Fryer organized the same establishment in 1860, and during his management it was very successful. The establishment is very large and complete, and is well supplied with plant and machinery. The works will be especially devoted to architectural work and large castings.

The Fletcher Furnace, Buffalo, is nearly ready to blow in.

## PENNSYLVANIA.

The Pennsylvania Steel Company, of Harrisburg, have orders sufficient to keep the works running day and night for four months. Twelve hundred hands are employed.

Messrs. E. & G. Brooke, of Birdsboro, and the Phoenix Company, owners of the old Elizabeth Copper Mine, near Knaubertown, Chester county, have leased it to Mr. Charles M. Wheatley, of Philadelphia, who will at once open the old shafts and take out the low grade copper ores. Copper is advancing in price consequent upon a foreign war, and the business of mining and smelting this metal has become very profitable.

The Sheridan furnaces, Lebanon (Kaufman & Co.), are now making an iron of such superior quality for blooms, &c., that there is a demand for it from all parts of the country. They recently sent 20 tons to Montana. This superiority is the result of the mixture of the ores.

Over one hundred men are at present employed in the Chester Rolling Mills, manufacturing plate iron.

The blast was put on at the Allen Furnace, Sharpsville, Sunday, the 24th ult., at 11 a.m. Work is going on at Stewart Furnace No. 2. Speaking of No. 1 (the Stewart No. 1) the *Sharon Herald* says: At the Stewart Furnace No. 1 more can be seen now than when they were shoveling it out. We thought then that the lining had burned out up to the top, but find on more careful examination that it didn't. It burned out only from the top of the boshes, about fifteen feet up, when the top portion settled down gradually, or rapidly—no knowing which—the upper portion being almost as good as when it was put in. This would seem to prove that this particular part of the inside was where the most wear, friction or heat was, and consequently needed a little better material and more careful workmanship in putting it in than the other parts did. Heretofore, with very few exceptions, there was no difference once the knuckle was passed.

## PITTSBURGH AND VICINITY.

The South Side glass houses are closing for repairs.

It is rumored that R. C. Schmertz & Co.'s Glass Works at Belle Vernon will run all summer.

Arrangements have just been completed, and a contract entered into with Messrs. Totten & Co. to furnish patent hollow chill rolls for the Belmont Works, of Wheeling, and for the works in Aetna.

The first shipment of pig iron to Europe has been made, according to a Baltimore paper. Five tons have been sent from Pittsburgh to Antwerp.

Zug's mill is again in operation.

The pipe works of Spang, Chalfant & Co. are running double time.

The Liberty Oil Refinery was totally destroyed by fire, caused by lightning, on Sunday morning. The Crescent Steel Works, of Miller, Metcalf & Parkin, just across from the refinery, were on fire a dozen times or more, but by the prompt action of the firemen the flames were extinguished each time with but trifling loss.

## MARYLAND.

The Baltimore Iron Company have ordered suspended pipe hot-blast stoves from P. L. Weimer, Lebanon, Pa.

The merchant mill, at Cumberland, ran but two weeks, and is again idle.

There has been no change in the status of the furnaces in Maryland for the past three months. The demand just about equals the supply, but at prices which do not more than cover the cost of the iron.

## OHIO.

We condense the following notes from the *Review* regarding Cleveland's industries: The Lake Erie Iron Company employ 120 men, and are running to full time on bar iron and forging. The Cleveland Iron Company are running their works pretty full, 500 hands, the usual number, being employed. J. H. Morley & Co., corroders of lead, contemplate adding to their establishment two new corrodery houses, with a capacity of forty tons each. Last week the firm of Younglove, Brew & Co. was dissolved by the withdrawal of Mr. Brew, and the Cleveland Agricultural Works and Architectural Iron Works will hereafter be conducted by Messrs. Younglove & Co. Business with the Cleveland Rolling Mill Company continues fair. There are 2000 workmen employed at the vast works of the concern. The King Iron Bridge and Manufacturing Company employ 100 men at their shops in this city, and have a fair number of contracts. A bridge was recently shipped to Nevada, and the company have work in Vermont, Maine and other states at this time.

The Belfont Mill, Ironton, has been in operation five months out of the past six.

It is stated that the mill at Wellsville is to be started at once, under the management of Mr. Daker.

## ILLINOIS.

At Joliet the old iron mill has resumed operations, making guide iron. The steel mill has been making 56 and 52 lb. rail.

## MICHIGAN.

But one of the two charcoal furnaces of the Jackson Iron Company, located at Fayette, is in operation. It will continue in blast during the season.

## WISCONSIN.

There are but two furnaces in blast in the State, viz., one Appleton and one National, both charcoal.

## MISSOURI.

Of the coke furnaces of this State four are in blast—one Missouri and three Vulcan. Of the charcoal five are in blast.

AMERICAN SCREW CO.,  
Providence, R. I.

Manufacturers of

IMPROVED  
Gimlet Pointed Wood Screws,  
Patented  
May 30,  
1876.

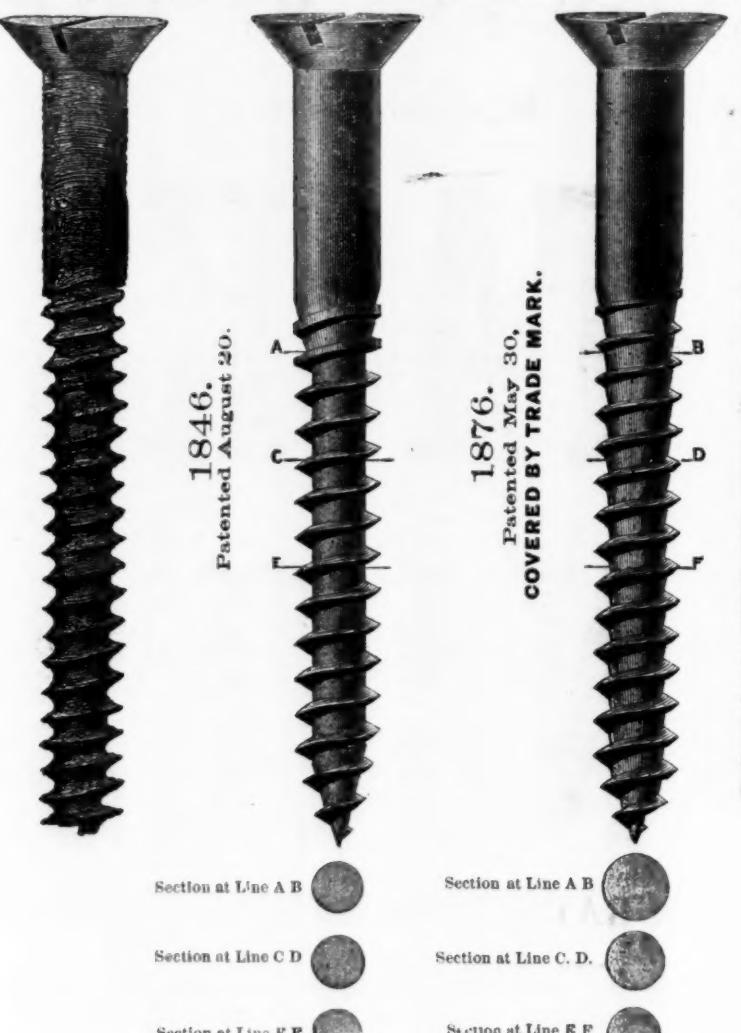
TRADE MARK

After forty years' experience we offer to the trade our **Centennial Screw**, patented May 30, 1876, as the best we have ever known.

The method of manufacturing is also patented, and we are changing our machinery as fast as possible, to manufacture the **improved** article only. To introduce them, they will be sold at same price as the old style screw.

The new screws will be packed in manila colored boxes with new label covering end of box, and **enlarged figures** showing plainly contents.

To distinguish this screw we have adopted a trade mark, which is also secured to us.



The above drawings show the progress of screw making from the old **blunt point** to style now adopted.

Experience has shown that the weak point of screws, as formerly made, is at the heel of the thread, where all the strains of forcing the screw into the wood naturally concentrate.

To avoid the sharp angle existing in the old style of screws has been the aim of all manufacturers, but every expedient hitherto adopted has proved as objectionable as the evil complained of.

It will be seen in our **new screw** that not only is the **sharp angle** avoided, but the strength very much increased, as illustrated above. See sections at lines.

## CLAIM.

"A Pointed Wood Screw having the outer periphery of the thread upon its body cylindrical, while a portion of the body below the thread and near the neck is conical, the remainder of the body to the point being cylindrical, and yet having all the thread brought to an edge of a constant angle, without jogs in the paths between the threads, substantially as described."

## Heating Steel for Forging.

As much trouble and loss are caused by improper heating in the forge fire as in the tempering fire, although steel may be heated safely very hot for forging if it be done properly, but any high degree of heat, no matter how uniform it may be, is unsafe for hardening.

The trouble in the forge fire is usually uneven heat, and not too high heat. Suppose the piece to be forged has been put into a very hot fire, and forced as quickly as possible to a high yellow heat, so that it is almost up to the scintillating point. If this be done, in a few minutes the outside will be quite soft and in nice condition for forging, while the middle parts will be not more than red hot. The highly heated soft outside will have very little tenacity—that is to say, this part will be so far advanced toward fusion that the particles will slide easily over one another, while the less highly heated inside parts will be hard, possessed of high tenacity, and the particles will not slide so easily over one another.



Fig. 1.

Now let the piece be placed under the hammer and forged, and the result will be as shown in Fig. 1.

The soft outside will yield so much more readily than the hard inside, that the outer particles will be torn asunder, while the inside will remain sound, and the piece will be pitched out and branded "burned."

Suppose the case to be reversed and the inside to be much hotter than the outside—that is, that the inside shall be in a state of semi-fusion, while the outside is hard and firm.

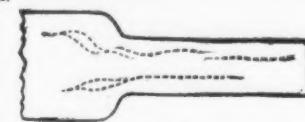


Fig. 2.

Now let the piece be forged and we shall have the case as shown in Fig. 2. The outside will be all sound and the whole piece will appear perfectly good until it is dropped, and then it is found to be hollow inside, and it is pitched out and branded "burst."

In either case, if the piece had been heated soft all through, or if it had only been red hot all through, it would have forged perfectly sound and good.

If it be asked, Why then is there ever any necessity for smiths to use a low heat in forging, when a uniform high heat will do as well? we answer:

In some cases a high heat is more desirable to save heavy labor, but in every case where a fine steel is to be used for cutting purposes, it must be borne in mind that very heavy forging refines the bars as they slowly cool, and if the smith heats such refined bars until they are soft, he raises the grain, makes them coarse, and he cannot get them fine again unless he has a very heavy steam hammer at command and knows how to use it well.

In following the above hints there is a still greater danger to be avoided, that is incurred by letting the steel lie in the fire after it is properly heated. When the steel is hot through it should be taken from the fire immediately, and forged as quickly as possible.

"Soaking" in the fire causes steel to become "dry" and brittle, and does it more injury than any bad practice known to the most experienced. Respectfully,

MILLER, METCALF & PARKIN.

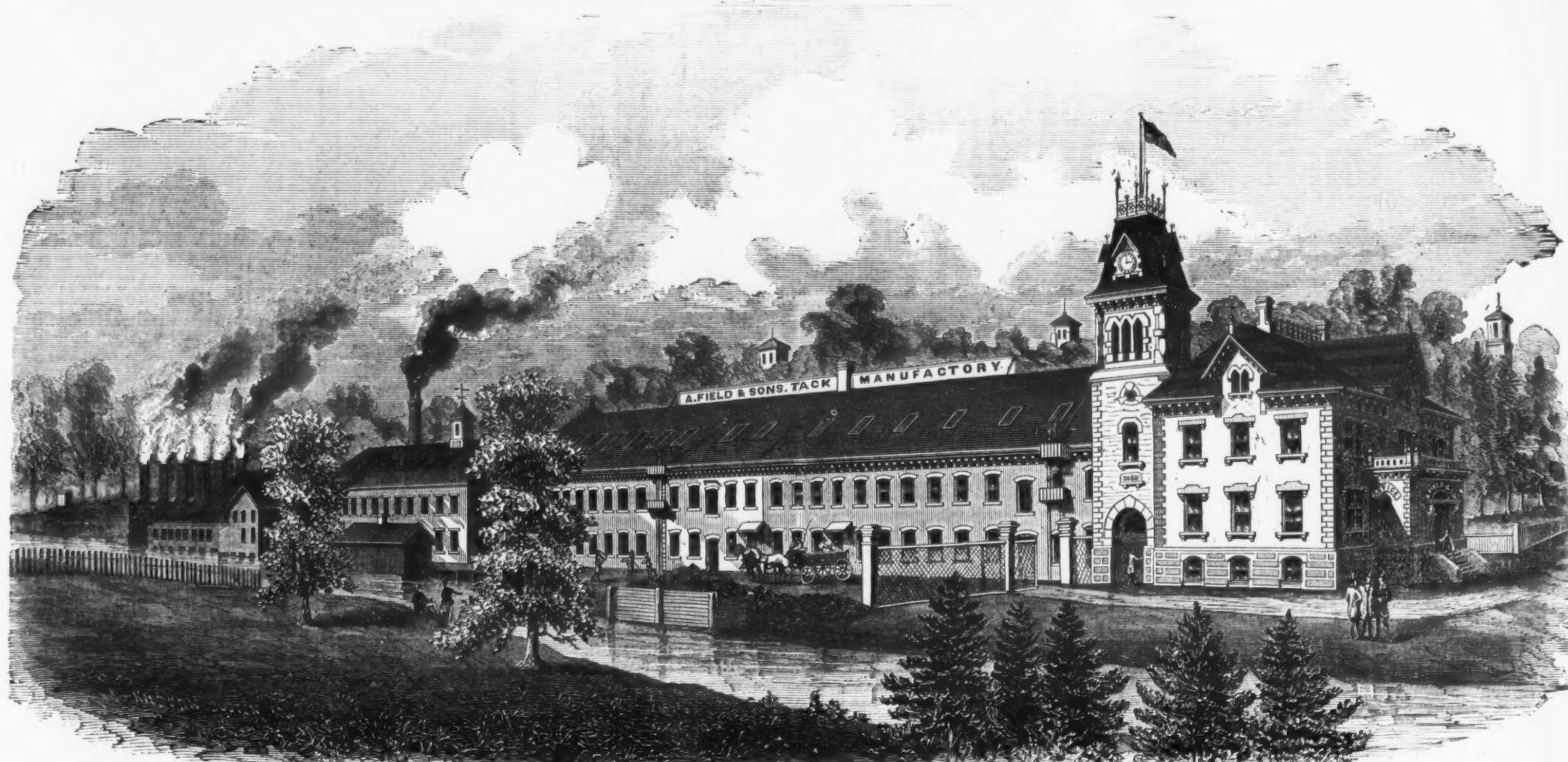
Pittsburgh, July 2, 1877.

The Empress of Russia's train, fitted for sanitary purposes, has carriages of the American type with a walk from end to end. At each side is a double row of beds with spring supports to ease joltings. The subsidiaries are a mattress on elastic frame, two pillows, a cloth below, and a counterpane. Should the invalid's head require to be raised there is an appliance for that purpose; if he can use his hands a movable shelf for the articles he may need is at his disposal. There are sixteen beds in each carriage. Attached to the train is a cooking carriage, a provision room and two doctor's store rooms, with linen, lint, bandages, &c., and in each compartment are lavatories, &c. There are carriages for the nurses, &c., and in some, instead of beds, are chairs, which can be converted into beds or sofas. The emperor, empress, and court inspected the train before it left the camp, and took part in the vocal service of prayer by which the event was accompanied.

A board of naval constructors and engineers, Rear Admiralty Mullany, president, appointed to consider the advisability of completing the iron-clads at Ronch's shipyard, has recently been in session at Chester. It is expected that it will recommend to the Navy Department the speedy completion of the monitors at the yard in all the details, and will also recommend the erection of a suitable mill for the fabrication of heavy armor plates of from 10 to 18 tons each, we at present being entirely dependent upon the English manufacturers for this class of material. A mill to furnish plate iron for armored vessels is required, but the necessary outlay of capital would hardly be justified unless encouraged by the general government. In the event of receiving this encouragement, Mr. Roach proposes to erect a large mill at his yard at Chester, or enlarge the rolling mill at South Chester.—*Philadelphia Press*.

The Harlan & Hollingsworth Company, of Wilmington, Del., are busy in their car department with South American orders. These include seven narrow-gauge passenger cars for the Campos and Carangola Railway, of Brazil. Three of them are a combination of first and second-class accommodations, the two compartments being separated by a central partition. In addition to the above, there are ten passenger cars of wider gauge in process of construction for the Dom Pedro II Railway.

ESTABLISHED 1827.



ENTIRE LENGTH OF WORKS 700 FEET.

# A. FIELD & SONS

## TAUNTON, MASS.

Manufacturers of

# TACKS

# NAILS

BRADS AND PATENT BRADS.

IRON  
COPPER  
TINNED  
SWEDES IRON  
UPHOLSTERERS'  
CARD CLOTHING  
PAIL AND TUB  
GIMP  
LACE  
PATENT COPPER PLATED  
LARGE HEAD CARPET

FINISHING  
TRUNK  
CLOUT  
CHAIR  
CIGAR BOX  
HUNGARIAN  
HOB  
SILVERED OR JAFANNED LINING  
SILVERED OR JAPANNED SADDLE  
TUFTING  
COPPER CUT

LEATHERED CARPET  
TINNED CARPET  
COLORED COATED CARPET  
COFFIN LINING  
MINERS'  
BRUSH  
LOOKING GLASS  
SHOE OR LASTING  
ROUND HEAD  
ROOFING  
EVERY STYLE OF

BOAT REGULAR  
BOAT CHISEL POINTED  
FINE TWO PENNY  
FINE THREE PENNY  
PATENT COPPER PLATED  
CHANNEL  
AMERICAN IRON SHOE  
SWEDES IRON SHOE  
ZINC SHOE  
STEEL SHOE  
CHARCOAL IRON SHOE

With New, Improved, and Patented Machinery, we shall now make

## GLAZIERS' POINTS,

ONE OF OUR SPECIALTIES.

Any variation from the regular size or shape of the above named goods made from samples to order.

QUALITY GUARANTEED TO BE SATISFACTORY.

OFFICES AND FACTORIES. - - - - - TAUNTON, MASS.

Warehouse and Salesroom at 78 Chambers Street, New York.

# Trade Report.

Office of THE IRON AGE,

TUESDAY EVENING, July 3, 1877.

The past week has been without feature of general interest in Wall street, and the dullness usual at this season is supplemented by the lack of speculative interest in the street. The money market continues very easy for those who have acceptable collateral. The rate on call loans is 1 to 2 per cent. The discount rate on prime business paper is 3 to 5 per cent.

The gold market is without important feature. The following table shows the daily range of the premium:

	Highest.	Lowest.
Thursday	105 1/2	105 1/2
Friday	105 1/2	105 1/2
Saturday	105 1/2	105 1/2
Monday	105 1/2	105 1/2
Tuesday	105 1/2	105 1/2

Government bonds are strong, with the exception of the new 5's and 5-20's of 1865. Thus far the subscriptions to the new 4 per cent. are somewhat in excess of \$8,000,000, and it is believed a total of \$25,000,000 will be reached before the books are closed for the popular subscription. We give below the closing quotations of the bond market.

The stock market is without feature calling for special notice. To-day showed a decided improvement over yesterday, however, and by noon the general list had advanced 4 1/2 per cent. This advance was not maintained in all cases, and toward the close the market manifested a tendency to weakness.

The last bank statement was somewhat more favorable than was expected, there having been an increase in the legal tender reserve of \$2,103,900, and in the gold average of \$1,244,000, the two increasing the total reserve \$3,347,900, and the surplus reserve \$2,554,875, the latter now standing at \$21,190,450. The following is a comparison of the averages for the past two weeks:

	June 23.	June 30.	Differences.
Loans	\$250,16,500	\$251,65,600	Inc. \$1,239,100
Specie	16,209,000	17,452,000	Inc. 1,244,000
Legal tend're	58,355,600	60,359,500	Inc. 2,103,900
Deposits	223,16,100	226,488,200	Inc. 3,347,900
Circulation	15,705,600	15,643,200	Dec. 122,400

As we go to press one day earlier this week than usual, owing to the interruption of the national holiday, we are unable to give the usual tables showing the foreign trade movements for the week.

Government bonds at the close were quoted as follows, with the tone of the market strong:

	Bid.	Asked.
U. S. Currency 6's.	123 1/2	123 1/2
U. S. 6's 1871 registered.	112	111 1/2
U. S. 6's 1882 consol'd.	111 1/2	111 1/2
U. S. 6's 1865 new reg.	112 1/2	112 1/2
U. S. 6's 1865 cou.	106 1/2	106 1/2
U. S. 6's 1867 reg.	106 1/2	106 1/2
U. S. 6's 1867 cou.	109 1/2	109 1/2
U. S. 6's 1868 reg.	109 1/2	109 1/2
U. S. 6's 1868 cou.	112 1/2	112 1/2
U. S. 6's 1869 reg.	112 1/2	112 1/2
U. S. 6's 1870 coupon.	113	113
U. S. 58 1875 coupon.	112 1/2	112 1/2
U. S. 4 1/2 1871 registered.	108 1/2	108 1/2
U. S. 4 1/2 1871 coupon.	108 1/2	108 1/2

The following are the closing quotations of active shares:

	Bid.	Asked.
Atlantic and Pacific Telegraph.	20	21
Chicago and Northwest.	12 1/2	12 1/2
" Pref.	12 1/2	12 1/2
Chicago, Rock Island and Pacific.	45 1/2	46 1/2
Chicago, Burlington and Quincy.	91 1/2	91 1/2
Clev. Col. Cinc. and Ind.	98 1/2	100
Cleveland and Pittsburgh.	23	24
Chicago and Alton.	72 1/2	79
" Pref.	80	83 1/2
Delaware, Lack. and Western.	37 1/2	37 1/2
Delaware and Hudson Canal.	35 1/2	35 1/2
Express-Adams.	90	91 1/2
" American.	43	43 1/2
" United States.	42	43
Wells, Fargo & Co.	84	87
Erie.	6 1/2	6 1/2
Harlem.	138	140
Hannibal and St. Joseph.	15 1/2	15 1/2
" Pref.	32 1/2	33
Illinois Central.	53 1/2	54
Lake Shore.	40 1/2	48 1/2
Michigan Central.	40 1/2	41
Morris and Essex.	66 1/2	66 1/2
Milwaukee and St. Paul.	101 1/2	101 1/2
" Pref.	51 1/2	51 1/2
New York Central.	91 1/2	92
New Jersey Central.	7 1/2	7 1/2
Ohio and Mississippi.	2 1/2	6
" Pref.	2 1/2	2 1/2
Pacific Mail.	19 1/2	20 1/2
Pittsburgh and Fort Wayne.	84	85
Quicksilver.	14	22 1/2
St. Louis Kansas City Northern.	3 1/2	4
Toledo, Wabash and Western.	21	22 1/2
Union Pacific.	3 1/2	4
Western Union Telegraph.	65	66
	58 1/2	58 1/2

## MINING STOCKS.

Mr. Ogden Haight, No. 16 New street, sends us the following report of the business of the New York Mining Stock Exchange for the week ending July 4:

	Bid.	Offered.	Shares.
Allouez Mining Co.	\$2.00	\$2.00	3,600
Atlantic	6.75	7.25	700
Central & Hecla Min. Co.	165.00	170.00	70
Franconia	38.50	40.50	300
Madison	4.00	8.00	300
Minnesota	.....	.....	.....
Messnard (ass't paid.)	50	1.00	.....
National	25	35	900
Oscoda	18	21	100
Pewabic	1.00	2.00	.....
Quincy	33.50	35.00	100
Ridge	2.00	5.50	.....
Rockland	.....	.....	.....

## GOLD STOCKS.

Am. Flag G. M. Co., Col.

Bottail

Caledonia

California

Consolid'd Imperial

Consolid'd Virginia

Crown Point

Eureka, G. V., ex div.

Exchequer

Gould & Curry

Hale & Norcross

Julia

Justice

Kentuck

Mexican

Overman

Raymond & Ely

Uphir

Savage

Seidl, Bolcher

Sierra Nevada

Silver Hill

\* No sales July 4.

Union Con. Gold and Silver. 6,000 7.00  
Yellow Jacket " 12,000 14.00  
LEAD STOCKS. 5,00 400  
SILVER STOCKS. 25  
TUNNEL COMPANIES. 3,00 400  
Bottail Tunnel. 3,00 400  
MISCELLANEOUS STOCKS. 1,000,000 4,00  
Smith & Parmelee. 12 ..  
Hukill, of Col. ..  
United Petroleum Farms. 105 ..

The Stanley Rule and Level Co. have issued their revised discount sheet under date of 2d inst. The only changes since their last discount sheet was issued, are on Rules, the new prices for which have already been noticed in these columns.

P. & Corbin will soon issue to the trade their revised list of Locks, Latches, &c., changing the discount to 40 and 5 per cent., the effect of which will be a reduction on most of the line from former rates, particularly on the higher priced goods. Their revised list of miscellaneous goods, which will be ready for distribution within a few days, will contain some changes. They have issued the following notice:

Having enlarged our facilities at our factory for storing and shipping goods, we shall from and after this date forward all heavy shipments direct from our works at New Britain.

Express orders from the West and South can be filled from our New York warehouse, where we shall continue to keep a general stock of our goods as heretofore.

To prevent delay in future the trade are requested to send orders direct to the factory.

P. & F. CORBIN.

New Britain, Conn.; New York city, July 2, 1877.

The following are the Russell & Erwin Mfg. Co.'s revised prices and discounts of hardware and description of new goods, issued under date of 2d instant, and to be attached to vol. 4, catalogue of 1877. Their terms are: "Cash, subject to draft, at sight, after 30 days. A discount of 2 per cent. will be allowed if paid within 30 days. All orders subject to our ruling rates at date of shipment. No prices guaranteed. Goods in transit at risk of purchaser."

Among the new goods presented by them are a line of cheap Locks, including Upright Rim, Horizontal Rim, Mortise Knob and Rim Locks, all made to pull out reverse. They also present a line of Upright and Horizontal Rim Knob Locks and Mortise Locks made with their Patent Steel Nickel-plated Keys, which are offered at lower prices than these goods have ever been sold before. Their price for Patent Steel Keys is greatly reduced.

RUSSELL & ERWIN MANUFACTURING CO.'S REVISED PRICES AND DISCOUNTS.

JULY 2, 1877.

Locks and Latches in Numerical Order.

Page of Price

No. of Lock. 1877 Per List, doz.

No. of Lock. 187

			Dis. per cent
of 1877 List.			
Brass Cupboard Bolts			
Crofty's Bolts			
Mortise Bolts			
Chain Bolts			
and 151, Brass Cupboard Bolts, all numbers			
Brass Cupboard Bolts, all numbers			
Plain 151			
Ox Balls			
Cabin Door Hooks			
Coat and Hat Hooks			
School House Hooks			
Harness Hooks			
Clothes Line Hooks			
Box and Cotton Hooks			
Box Chisels			
Twine Boxes			
Cork Squeezers			
Boot Jacks			
Spurs			
Bed Joint Fasts			
Polished Steel Fire Irons			
Polished Steel Fire Iron Standards			
Cool Tonga			
Iron Shovels and Tonga			
Brass Head Shovels and Tonga			
Brass Head Shovels and Tonga			
Pokers			
Poker and Lid Lifter			
Jamb Hooks			
Make list on Bake Pans, No. 1, \$4.60; No. 2, \$5.60; No. 3, \$5.25; No. 4, \$5.25; No. 5, \$4.75; No. 6, \$4.60; No. 7, \$4.60; No. 8, \$4.40; No. 9, \$4.60; No. 10, \$7.10; No. 11, \$6.75			
Waffle Irons			
Meat Cutters			
Meat Cutters			
Ladder Sockets			
Garden Hooks			
Gate Bar Sockets			
Gate Pulley			
and 277, Padlocks and Padlock Keys			33 1/3
Padlocks, Circular and Switch			
3. Screws			
Flat Head, Iron			
Round Head, Iron			
Flat Head, Brass			
Round Head, Brass			
Japanned, Flat Head			30 and
Kahala Bronzed, Flat Head			30 and
4. Silver-plated Screws on Iron, Flat Head			
Silver-plated Screws on Iron, Round Head			
Silver-plated Screws on Brass, Flat Head			
5. Side Knob Screws			
6 to 277, Cabinet Locks, Keys and Blanks			
Mallory, Wheeler & Co. have issued, under date of 1st instant, their revised price list of Locks, Latches, &c., and a descriptive circular of new goods which will be found below. Their regular discounts are also given. Sargent & Co. are their agents in this city:			
Attach to our Condensed Price Book of January 1877.			
OFFICE OF MALLORY, WHEELER & CO., NEW HAVEN, CONN., July 1, 1877.			
CIRCULAR.			
We add to our variety the following very liberal Locks and Latches:			
Littlejohn's Upright Rim Knob Lock.—Pull on Reverse.			
Without Knobs, Per Dozen			
D. A. 4x3 1/4 in., Iron Bolts, Bronzed Iron Key, with Lever Stop to Latch			\$2.
Littlejohn's Horizontal Rim Knob Lock.—Pull on Reverse.			
D. B. 4 1/2x3 1/4 in., Iron Bolts, Bronzed Iron Key, with Lever Stop to Latch			2.
Littlejohn's Horizontal Rim Closet or Dead Lock for Right or Left Hand Doors			
E. 3x2 in., Iron Bolt, Bronzed Iron Key			2.
F. 3 1/2x2 1/4 in., Iron Bolt, Bronzed Iron Key			2.
Littlejohn's Horizontal Rim Knob Latches.			
G. 3 1/2x2 in., Iron Bolt			2.
H. 3 1/2x2 in., Iron Bolt and Slide Bolt			2.
Littlejohn's Mortise Knob Lock.—Pull out Revers.			
J. 3 1/2x3 1/4, Iron Front and Bolts, Bronzed Iron Key			2.
Littlejohn's Mortise Knob Latch.			
K. 1 1/4x3 1/2, Iron Front and Bolt			1.
In reversing our Locks by pulling latch bolt forward and turning half round, none of the interior mechanism is at all disturbed or put out of place; they are simple and durable, and we warrant them to be equal in all respects to the old style Latches.			
It is not the business of the carpenter when putting the Lock upon the door to take off the cap and change the latch bolt, as by so doing he is liable to displace the inner parts, lose cap screw, &c.			
We therefore discard from our list (some 70 numbers) all Locks that reverse by removing the cap, and furnish them, if wanted, but price will be the same as the pull out.			
* The following are the numbers of discarded Locks that reverse by removing cap:			
1. 15 0243 1/4 883 975 26			
1/2 17 0247 1/2 884 976 26			
1/2 17 0247 1/2 887 977 26			
1/2 17 0251 1/2 960 979 26			
1/2 17 0251 1/4 960 1/2 980 26			
3 000215 1/2 779 964 981 26			
03 0215 1/2 781 964 1/2 2600 26			
3 1/2 000215 1/2 783 970 2601 26			
5 0215 1/2 784 971 2602 26			
05 0239 1/2 787 972 2603 26			
11 0239 1/2 789 973 2604 26			
13 0243 1/2 881 974 2605 26			
TERMS OF SALE.			
Discount on all goods on our list, except Padlocks and Padlock Keys, 35 per cent., net cash, subject to our draft thirty days after date of invoice, with funds par in New York, Boston or Philadelphia.			
Padlocks and Padlock Keys, discount 33 1/3 per cent., net cash.			
A bonus of 2 per cent. may be deducted from all bills of paid within thirty days of their date.			
Funds par in New York, Boston or Philadelphia, delivered on board at New Haven. One per cent. allowed on all bills for freight to New York.			
All orders will be subject to our prices ruling at time of shipment.			
Prices not guaranteed. Moderate charge for boxes.			
The following changes are this day made in our prices:			
Upright Rim Knob Locks.			
Page in 1876			Page in 1876
New Old Price, Price, Illust'd Pr dz. Pr dz. Book.			New Old Price, Price, Illust'd Pr dz. Pr dz. Book.
1. \$3.50 \$5.75 47			229 10.75 21.25 4
1/2 4.15 4.25 50			230 7.50 10.50 3
5. 5.00 7.25 47			500 30.00 40.00 3
10 4.85 4.75 50			500 34.00 38.00 3
1/2 5.75 9.25 50			501 37.50 43.00 3
2 27.00 30.00 32			501 1/2 35.50 41.00 3
4 50.00 60.00 31			503 44.00 48.00 3
3 17.00 17.50 54			503 1/2 42.00 46.00 3
14 19.75 22.00 55			504 47.00 54.00 3
18 26.50 27.00 55			504 1/2 52.00 57.00 3
38 30.00 32.00 67			505 50.00 60.00 3
39 15.00 20.00 56			505 1/2 48.00 58.00 3
74 18.50 21.00 57			537 4.00 5.00 5
21 21.50 24.00 57			537 1/2 5.50 6.50 5
18 15.50 18.00 57			532 7.50 8.50 5
85 12.50 15.50 57			574 18.50 20.50 4

Horizontal Rim Knob Locks.										
		Page in					Page in			
		New	Old	1876	No.	New	Old	Price.	Price.	
No.	Pr dz.	Pr dz.	Book.	Pr dz.	Pr dz.	Book.	Pr dz.	Pr dz.	Book.	
8	\$19.00	\$19.00	5	247	8.50	10.50	8	8.50	10.50	
9	42.00	50.00	5	247	7.50	9.50	9	7.50	9.50	
10	48.00	62.00	5	247	8.50	10.50	10	8.50	10.50	
12	56.00	72.00	5	247	8.50	10.50	12	8.50	10.50	
14	100.00	125.00	4	247 <sup>1/2</sup>	4.50	6.25	14	4.50	6.25	
			5	247 <sup>1/2</sup>	4.50	6.25				
140	10.50	12.50	17	247 <sup>1/2</sup>	6.00	7.50	140	6.00	7.50	
141	13.50	15.50	18	247 <sup>1/2</sup>	6.00	7.50	141	6.00	7.50	
142	11.50	14.50	17	247 <sup>1/2</sup>	6.00	7.50	142	6.00	7.50	
143	14.50	17.50	18	247 <sup>1/2</sup>	6.00	7.50	143	6.00	7.50	
144	14.50	17.50	17	247 <sup>1/2</sup>	6.25	8.00	144	6.25	8.00	
145	10.00	12.00	17	247 <sup>1/2</sup>	6.25	8.00	145	6.25	8.00	
146	12.00	15.50	17	247 <sup>1/2</sup>	6.25	8.00	146	6.25	8.00	
147	11.00	14.00	17	247 <sup>1/2</sup>	6.25	8.00	147	6.25	8.00	
148	13.00	17.50	17	247 <sup>1/2</sup>	6.25	8.00	148	6.25	8.00	
149	14.00	17.00	17	247 <sup>1/2</sup>	6.00	7.50	149	6.00	7.50	
149 <sup>1/2</sup>	13.00	15.00	18	251 <sup>1/2</sup>	7.25	8.50	149 <sup>1/2</sup>	7.25	8.50	
150	15.00	18.50	18	251 <sup>1/2</sup>	7.50	9.00	150	7.50	9.00	
151	14.00	17.00	18	251 <sup>1/2</sup>	7.50	9.00	151	7.50	9.00	
152	16.00	20.50	18	251 <sup>1/2</sup>	7.50	9.00	152	7.50	9.00	
231	9.50	12.50	12	259	4.25	5.00	231	4.25	5.00	
233	10.50	14.50	12	259	4.25	5.00	233	4.25	5.00	
235	13.50	15.50	12	259	4.25	5.00	235	4.25	5.00	
237	14.50	17.50	12	259	4.25	5.00	237	4.25	5.00	
239	7.00	8.50	14	259	3.50	4.25	239	3.50	4.25	
0239	6.50	8.50	14	259	3.50	4.25	0239	3.50	4.25	
				Same as	6.25	7.50				
				No. 0239 <sup>1/2</sup>	6.25	7.50				
0239 <sup>1/2</sup>	3.25			(discarded), but pull	6.25	8.50	0239 <sup>1/2</sup>	3.25		
				out rev're.	6.25	8.50				
0239 <sup>1/2</sup>	4.50			out rev're.	6.25	8.50	0239 <sup>1/2</sup>	4.50		
				Same as	6.25	7.50				
				No. 0239 <sup>1/2</sup>	6.25	7.50				
0239 <sup>5/8</sup>	4.75			(discarded), but pull	6.25	8.50	0239 <sup>5/8</sup>	4.75		
				out rev're.	6.25	8.50				
241	8.00	10.50	12	1033	11.00	12.50	241	11.00	12.50	
0241	7.00	10.50	14	1034	14.50	17.50	0241	14.50	17.50	
243	8.50	10.00	13	1035	12.00	14.00	243	12.00	14.00	
0243 <sup>1/2</sup>	5.75	6.50	15	1036	15.50	17.50	0243 <sup>1/2</sup>	5.75	6.50	
245	9.50	12.00	13	1036	15.50	17.50	245	15.50	17.50	
Rim Knob Latches.										
		New					Old			
		Price.	Price.	Illust'd.	No.	Price.	Price.	Per doz.	Per doz.	
No.	Pr dz.	Pr dz.	Book.	Pr dz.	Pr dz.	Book.	Pr dz.	Pr dz.	Book.	
57				\$8.00			\$10.00			
59				8.00			9.00			
61				9.00			10.00			
61				15.00			19.50			
493				15.00			19.50			
493				15.00			19.50			
494				15.00			19.50			
Rim Night Latches.										
		New					Old			
		Price.	Price.	Per doz.	No.	Price.	Price.	Per doz.	Per doz.	
No.	Pr dz.	Pr dz.	Book.	Pr dz.	Pr dz.	Book.	Pr dz.	Pr dz.	Book.	
57				\$8.00			\$10.00			
59				8.00			9.00			
61				9.00			10.00			
491				15.00			19.50			
493				15.00			19.50			
494				15.00			19.50			
Upright Rim Closet or Dead Locks.										
		New					Old			
		Price.	Price.	Per doz.	No.	Price.	Price.	Per doz.	Per doz.	
No.	Pr dz.	Pr dz.	Book.	Pr dz.	Pr dz.	Book.	Pr dz.	Pr dz.	Book.	
155				\$4.30			\$4.75			
157				3.10			3.50			
Upright Rim Store Door Dead Locks.										
		Page in					Page in			
		New	Old	1876	No.	Pr dz.	Pr dz.	New	Old	
		Price.	Price.	Illust'd.	No.	Pr dz.	Pr dz.	Price.	Price.	
No.	Pr dz.	Pr dz.	Book.	Pr dz.	Pr dz.	Book.	Pr dz.	Pr dz.	Book.	
1	Key				1	Key				
16	\$15.50	\$21.00	37	416	\$15.50	\$21.00	416	9.50	12.50	
2	K'ys				2	K'ys				
16	10.50	25.00	37	416	10.50	25.00	416	9.50	12.50	
18	35.00	46.00	37	416	13.50	16.00	416	13.50	16.00	
19	21.00	26.00	37	416 <sup>1/2</sup>	12.50	18.00	416 <sup>1/2</sup>	12.50	18.00	
20	22.50	29.00	37	416 <sup>1/2</sup>	16.50	22.00	416 <sup>1/2</sup>	16.50	22.00	
20	Key				1	Key				
166	18.00	24.00	38	421	9.50	12.50	421	9.50	12.50	
2	K'ys				2	K'ys				
166	21.00	28.00	38	421	18.00	24.00	421	18.00	24.00	
166	21.00	31.00	36	466	18.00	24.00	466	18.00	24.00	
1	Key				1	Key				
167	15.00	23.00	36	466	21.00	28.00	466	21.00	28.00	
168	14.50	23.00	36	466	21.00	28.00	466	21.00	28.00	
2	K'ys				1	Key				
168	18.50	28.00	36	468	15.00	18.00	468	15.00	18.00	
168	11.50	17.00	36	468	18.00	22.00	468	18.00	22.00	
2	K'ys				2	K'ys				
168 <sup>1/2</sup>	15.50	22.00	36	468	15.00	18.00	468	15.00	18.00	
1	Key				1	Key				
170	20.00	24.00	8	472	17.00	18.00	472	20.00	22.00	
2	K'ys				2	K'ys				
170	23.00	28.00	8	472 <sup>1/2</sup>	15.00	17.00	472 <sup>1/2</sup>	15.00	17.00	
172	17.00	18.00	8	472 <sup>1/2</sup>	18.00	19.00	472 <sup>1/2</sup>	18.00	19.00	
21	20.00	22.00	8	520	24.00	27.00	520	24.00	27.00	
22	1	Key			521	27.00	33.00	521	27.00	33.00
23	470	20.00	24.00	7	522	36.00	49.00	522	36.00	49.00
2	K'ys				523	30.00	45.00	523	30.00	45.00
470	23.00	28.00	7	524	33.00	43.00	524	33.00	43.00	
1	Key				525	36.00	47.00	525	36.00	47.00
470 <sup>1/2</sup>	18.00	23.00	New	526	39.00	53.00	526	39.00	53.00	
470 <sup>1/2</sup>	21.00	25.00	New	527	42.00	59.00	527	42.00	59.00	
471 <sup>1/2</sup>	\$16.50	\$20.00	New							
Horizontal Rim Closet or Dead Locks.										
		Page in					Page in			
		New	Old	1876	No.	Pr dz.	Pr dz.	New	Old	
		Price.	Price.	Illust'd.	No.	Pr dz.	Pr dz.	Price.	Price.	
No.	Pr dz.	Pr dz.	Book.	Pr dz.	Pr dz.	Book.	Pr dz.	Pr dz.	Book.	
158	\$75.50	\$55.50	26	842	\$5.25	\$6.25	842	7.75	12.75	
160	7.00	6.50	26	842	7.75	8.75	842	7.75	8.75	
165	5.50	6.50	22	2	Key		2	Key		
167	7.00	8.50	20	842	7.75	8.75	842	7.75	8.75	
169	9.00	10.50	20	1	Key		1	Key		
173	7.00	8.00	22	843	6.75	8.25	843	6.75	8.25	
175	8.50	10.00	20	2	K'ys		2	K'ys		
177	10.50	12.00	20	843	9.25	10.75	843	9.25	10.75	
1	Key			1	Key		1	Key		
186	12.00	14.00	26	844	8.25	10.75	844	8.25	10.75	
2	K'ys			2	K'ys		2	K'ys		
186	14.00	16.00	26	844	10.75	12.75	844	10.75	12.75	
1	Key			1	Key		1	Key		
188	10.00	12.00	26	845	6.50	7.75	845	6.50	7.75	
2	K'ys			2	K'ys		2	K'ys		
188	12.00	14.00	26	845	9.00	10.75	845	9.00	10.75	
582	12.00	14.50	21	846	8.00	9.75	846	8.00	9.75	
582	14.00	16.50	21	846	10.50	12.00	846	10.50	12.00	
1	Key			1	Key		1	Key		
588	10.00	12.50	21	847	9.50	11.50	847	9.50	11.50	
2	K'ys			2	K'ys		2	K'ys		
588	12.00	14.50	21	847	12.00	14.00	847	12.00	14.00	
1	Key			1	Key		1	Key		
589	14.50	16.00	19	851	4.75	5.50	851	4.75	5.50	
2	K'ys			2	K'ys		2	K'ys		
589	16.50	18.00	19	851	6.25	6.75	851	6.25	6.75	
1	Key			1	Key		1	Key		
590	12.00	14.00	19	852	6.25	7.00	852	6.25	7.00	
2	K'ys			2	K'ys		2	K'ys		
590	14.00	16.00	19	852	7.50	8.25	852	7.50	8.25	

Master Keyed Horizontal Rim Dead Locks.											
Page in 1876				Page in 1876				Page in 1876			
No.	Price.	Price.	Illust'd	No.	Price.	Price.	Illust'd	No.	Price.	Price.	Illust'd
Pr. dz.	Pr. dz.	Pr. dz.	Book.	Pr. dz.	Pr. dz.	Pr. dz.	Book.	Pr. dz.	Pr. dz.	Pr. dz.	Book.
Page in 1876				Page in 1876				Page in 1876			
1876				1876				1876			
Illust'd				Illust'd				Illust'd			
Book.				Book.				Book.			
12				12				12			
13				13				13			
14				14				14			
15				15				15			
16				16				16			
17				17				17			
18				18				18			
19				19				19			
20				20				20			
21				21				21			
22				22				22			
23				23				23			
24				24				24			
25				25				25			
26				26				26			
27				27				27			
28				28				28			
29				29				29			
30				30				30			
31				31				31			
32				32				32			
33				33				33			
34				34				34			
35				35				35			
36				36				36			
37				37				37			
38				38				38			
39				39				39			
40				40				40			
41				41				41			
42				42				42			
43				43				43			
44				44				44			
45				45				45			
46				46				46			
47				47				47			
48				48				48			
49				49				49			
50				50				50			
51				51				51			
52				52				52			
53				53				53			
54				54				54			
55				55				55			
56				56				56			
57				57				57			
58				58				58			
59				59				59			
60				60				60			
61				61				61			
62				62				62			
63				63				63			
64				64				64			
65				65				65			
66				66				66			
67				67				67			
68				68				68			
69				69				69			
70				70				70			
71				71				71			
72				72				72			
73				73				73			
74				74				74			
75				75				75			
76				76				76			
77				77				77			
78				78				78			
79				79				79			
80				80				80			
81				81				81			
82				82				82			
83				83				83			
84				84				84			
85				85				85			
86				86				86			
87				87				87			
88				88				88			
89				89				89			
90				90				90			
91				91				91			
92				92				92			
93				93				93			
94				94				94			
95				95				95			
96				96				96			
97				97				97			
98				98				98			
99				99				99			
100				100				100			
101				101				101			
102				102				102			
103				103				103			
104				104				104			
105				105				105			
106				106				106			
107				107				107			
108				108				108			
109				109				109			
110				110				110			
111				111				111			
112				112				112			
113				113				113			
114				114				114			
115				115				115			
116				116				116			
117				117				117			
118				118				118			
119				119				119			
120				120				120			
121				121				121			
122				122				122			
123				123				123			
124				124				124			
125				125				125			
126				126				126			
127				127				127			
128				128				128			
129				129				129			
130				130				130			
131				131				131			
132				132				132			
133				133				133			
134				134				134			
135				135				135			
136				136				136			
137				137				137			
138				138				138			
139				139				139			
140				140				140			
141				141				141			
142				142				142			
143				143				143			
144				144				144			
145				145				145			
146				146				146			
147				147				147			
148				148				148			
149				149				149			
150				150				150			
151				151				151			
152				152				152			
153				153				153			
154				154				154			
155				155				155			
156				156				156			
157				157				157			
158				158				158			
159				159				159			
160				160				160			
161				161				161			
162				162				162			
163				163				163			
164				164				164			
165				165				165			
166				166				166			
167				167				167			
168				168				168			
169				169				169			
170				170				170			
171				171				171			
172				172				172			
173				173				173			
174				174				174			
175				175				175			
176				176				176			
177				177				177			
178				178				178			
179				179				179			
180				180				180			
181				181				181			
182				182				182			
183				183				183			
184				184				184			
185				185				185			
186				186				186			
187				187				187			
188				188				188			
189				189				189			
190				190				190			
191				191				191			
192				192				192	</		

## Mortise Front Door Locks and Vestibule Latches.

Page in New Old 1876		Page in New Old 1876	
Price, Price, Illus'd	Pr. dz. Book.	Price, Price, Illus'd	Pr. dz. Book.
\$2.00 \$7.00	78	554 \$2.00 \$7.00	80
34 72.00	78	554 \$2.00 \$7.00	80
35 72.00	79	554 \$2.00 \$7.00	80
36 72.00	79	554 \$2.00 \$7.00	80
37 84.00	93	752 42.00	80
38 78.00	84.00	752 34.00	80
39 93.00	93.00	752 34.00	80
40 28.00	37.00	83 752 34.00	80
41 38.00	47.00	97 754 48.00	80
42 56.00	62.00	91 755 54.00	80
43 44.00	50.00	77 755 48.00	80
44 53.00	61.00	756 57.00	80
45 53 1/2	61.00	66 57.00	80
46 36.00	42.00	82 757 60.00	80
47 33.00	40.00	758 60.00	80
48 48.00	64.00	96 758 60.00	80
49 80.00	99.00	74 949 99.00	80
50 82.00	99.00	88 947 62.00	80
51 50.00	60.00	75 950 50.00	80
52 62.00	72.00	89 953 38.00	80
53 47.00	53.00	953 38.00	80
54 With Plated Key	85	954 45.00	80
Plate Escutcheon	13.00	12.00	33.00
55 42.00	51.00	955 42.00	80
56 With Plated Key	99	955 34.00	80
57 Escutcheon	95 45.00	56.00	70
58 With Plt'd Shield	84	956 37.00	80
59 Escutcheon	95 47.00	60.00	70

## Sliding Door Locks.

Page in New Old 1876		Page in New Old 1876	
Price, Price, Illus'd	Pr. dz. Book.	Price, Price, Illus'd	Pr. dz. Book.
99 ..... \$25.00	\$33.00	169	169
92 ..... 22.00	27.00	189	189
93 ..... Per set.	Per set.	189	189
94 ..... 20.00	24.00	190	190
94 1/2 ..... Per set.	Per set.	191	191
95 ..... 18.50	20.50	180, 181	180, 181
96 ..... 23.00	24.50	180, 181	180, 181
97 ..... 44.00	47.00	180, 181	180, 181
98 ..... 8.00	10.00	190	190
99 Sliding Door Sheave—Iron Wheel.			
Size. New Price. Old Price. Page in 1876	Per set. Per set. Illus. Book.		
4 inch. \$1.50 \$1.40 193			
Mortise Knob Latches.			

Page in New Old 1876		Page in New Old 1876	
Price, Price, Illus'd	Pr. dz. Book.	Price, Price, Illus'd	Pr. dz. Book.
100 \$1.40 \$1.50	168	103 \$2.00	168
101 6.00 7.00	168	104 3.00	168
102 7.50 8.25	168	105 3.25	168
103 12.00 15.00	168	106 4.00	168
104 12.00 15.00	168	107 5.25	168
105 7.50 9.00	168	108 6.00	168
106 3.00 4.00	168	109 6.00	168
107 12.00 15.00	168	110 6.00	168
108 12.00 15.00	168	111 6.00	168
109 12.00 15.00	168	112 6.00	168
110 12.00 15.00	168	113 6.00	168
111 12.00 15.00	168	114 6.00	168
112 12.00 15.00	168	115 6.00	168
113 12.00 15.00	168	116 6.00	168
114 12.00 15.00	168	117 6.00	168
115 12.00 15.00	168	118 6.00	168
116 12.00 15.00	168	119 6.00	168
117 12.00 15.00	168	120 6.00	168
118 12.00 15.00	168	121 6.00	168
119 12.00 15.00	168	122 6.00	168
120 12.00 15.00	168	123 6.00	168
121 12.00 15.00	168	124 6.00	168
122 12.00 15.00	168	125 6.00	168
123 12.00 15.00	168	126 6.00	168
124 12.00 15.00	168	127 6.00	168
125 12.00 15.00	168	128 6.00	168
126 12.00 15.00	168	129 6.00	168
127 12.00 15.00	168	130 6.00	168
128 12.00 15.00	168	131 6.00	168
129 12.00 15.00	168	132 6.00	168
130 12.00 15.00	168	133 6.00	168
131 12.00 15.00	168	134 6.00	168
132 12.00 15.00	168	135 6.00	168
133 12.00 15.00	168	136 6.00	168
134 12.00 15.00	168	137 6.00	168
135 12.00 15.00	168	138 6.00	168
136 12.00 15.00	168	139 6.00	168
137 12.00 15.00	168	140 6.00	168
138 12.00 15.00	168	141 6.00	168
139 12.00 15.00	168	142 6.00	168
140 12.00 15.00	168	143 6.00	168
141 12.00 15.00	168	144 6.00	168
142 12.00 15.00	168	145 6.00	168
143 12.00 15.00	168	146 6.00	168
144 12.00 15.00	168	147 6.00	168
145 12.00 15.00	168	148 6.00	168
146 12.00 15.00	168	149 6.00	168
147 12.00 15.00	168	150 6.00	168
148 12.00 15.00	168	151 6.00	168
149 12.00 15.00	168	152 6.00	168
150 12.00 15.00	168	153 6.00	168
151 12.00 15.00	168	154 6.00	168
152 12.00 15.00	168	155 6.00	168
153 12.00 15.00	168	156 6.00	168
154 12.00 15.00	168	157 6.00	168
155 12.00 15.00	168	158 6.00	168
156 12.00 15.00	168	159 6.00	168
157 12.00 15.00	168	160 6.00	168
158 12.00 15.00	168	161 6.00	168
159 12.00 15.00	168	162 6.00	168
160 12.00 15.00	168	163 6.00	168
161 12.00 15.00	168	164 6.00	168
162 12.00 15.00	168	165 6.00	168
163 12.00 15.00	168	166 6.00	168
164 12.00 15.00	168	167 6.00	168
165 12.00 15.00	168	168 6.00	168
166 12.00 15.00	168	169 6.00	168
167 12.00 15.00	168	170 6.00	168
168 12.00 15.00	168	171 6.00	168
169 12.00 15.00	168	172 6.00	168
170 12.00 15.00	168	173 6.00	168
171 12.00 15.00	168	174 6.00	168
172 12.00 15.00	168	175 6.00	168
173 12.00 15.00	168	176 6.00	168
174 12.00 15.00	168	177 6.00	168
175 12.00 15.00	168	178 6.00	168
176 12.00 15.00	168	179 6.00	168
177 12.00 15.00	168	180 6.00	168
178 12.00 15.00	168	181 6.00	168
179 12.00 15.00	168	182 6.00	168
180 12.00 15.00	168	183 6.00	168
181 12.00 15.00	168	184 6.00	168
182 12.00 15.00	168	185 6.00	168
18			



about two tons; but from the present appearance of the ground in the end of this driving, it is safe to conclude that it will soon be a favorable change in the value of this level. *Speckled Mine*. The 3<sup>rd</sup> East continues very poor. The end of the driving shows a few spots of ore, but the ground does not look favorable. The 27<sup>th</sup> South, toward Kelly's shaft, produces a little ore, but not enough to value. Sinking has been started below the old workings in the open cast pit, but prospects there are not very cheering. April yield of the works mines 950 tons of 34 per cent; from the Speckled mine 100 tons, 30 per cent. *Trial Mines*. The driving at the Karsenberg continues very poor. Unless there is a favorable change shortly will be suspended, and the men will be put to cross-cutting north and south. At Nabakeep the shaft below the 17<sup>th</sup> is passing through some layers of unproductive ground. The level at Narrap is at present yielding a little more copper ore, but not enough to value. The trial shaft of the Ookiep Mine is being sunk through ground which is spattered through out with copper ore, but nothing of value has yet been intersected.

## EAST INDIES.

(Dundee & Co.)  
PATAVIA, JAVA, May 7, 1877.—*Tin*.—There will be sold at auction in this city 7,000 piculs Billiton Tin on each of the following Mondays: June 11, Aug. 13, Oct. 8 and Dec. 10. *Iron*.—Sales have been effected of Swedish at 11.50 to 12.50 guilders to arrive while English is selling on a moderate scale at unchanged rates. *Copper*.—Sheathing is in limited inquiry. *Coal*.—English is offering afford, but no sales have been effected, and the price is still in doubt. *Scotch*.—No Australia in the market. *Exchange*.—The result of the government sale on the 26th ult. was again a success, as the whole 1,500,000 guilders were allotted at par and better. For the French mail the transactions in private paper on Holland were on an unusually large scale at rates ranging from 100<sup>1/2</sup> to 101, the bulk being done at 100<sup>1/2</sup>. Sterling credits found buyers at 11.95 to 12 per pound sterling, while the demand for bank bills was met at 12.05.

Aitken, Spence & Co.

COLOMBO, Ceylon, May 12, 1877.—*Plumbago* continues in fair request; prices unchanged. We quote free on board, cost and commission, but without freight, exchange at par, 2 per rupee; Lump, cleaned, including packages per ton and duty, 30<sup>1/2</sup>; Chip, 30<sup>1/2</sup>; and 30<sup>1/2</sup> per ton. *Lead*.—There have been exported to the United States from the island since Oct. 1, last, 55,000 cwt., against 34,850 last year; to England, 16,200; to Marseilles, 234; to India, 10; to Australia, 100; together this season thus far 73,063, against 81,944 in 1876; 66,415 in 1875, and 100,227 in 1874. *Shipping*.—The Vesuvius sailed for Allepey on the 26th ult. with cargo. She has been followed by the Una, 352 tons, which will sail for Galle next week to fit up. The sailing vessel rate for Plumbago for London is 1 per cent. *Exchange*.—Credits, 1.9<sup>1/2</sup> documents, 1.10 1-16; banks' selling rate, 1.9 11-16; private rate for credits, 1.9 13-16, all at six months' sight on London.

## Our English Letter.

Review of the British Iron, Steel, Metal and Hardware Trades.

(From our Regular Correspondent.)

SHEFFIELD, Eng., June 18, 1877.

## TRADE GENERALLY

rules very quiet in all directions, the only branch in which there is any real movement in a forward direction being the rail trade, and that mostly in respect of steel rails. This fact is very well shown by the special Board of Trade return for May. This return shows that of iron rails the total export was 21,374 tons, of the value of £142,830, the principal buyers being Sweden and Norway (5246 tons), United States (1376 tons), British India (4141 tons) and Australia (4371 tons). The quantity of steel rails exported in May reached 32,475 tons, valued at £287,703. Of this total Russia took 13,338 tons, Sweden and Norway, 3005 tons; Germany, 2923 tons; British North America, 6564 tons; British India, 2380 tons, and Australia, 2640 tons. These statistics prove very clearly what I have been asserting for some time past—namely, that the rail trade is improving, and that, Russia is again our best customer for this class of manufactures. It is also within my knowledge that the works best employed on steel rails, are the Dowlais, South Wales; Dronfield, Sheffield; Brown, Bayley & Dixon, Sheffield; Phoenix, Sheffield; the Barrow Company and the Scottish Steel Company, Glasgow. The Phoenix establishment alone is almost entirely running on home orders.

## GENERAL GRANT.

Your famous ex-president is now meeting with a more prominent series of public receptions. On Friday last the General was presented with the honorary freedom of the city of London at the Guildhall in the presence of nearly 1000 ladies and gentlemen. The freedom was given in the customary gold casket—this time of unusually fine workmanship. In reply the General made the following neat little speech:

"I believe that this honor is intended as much for the country which I have served in two capacities, quite as much as for myself. I am glad that this is so, because I want to see the happiest relations existing not only between the United States and Great Britain, but also between the United States and other countries. Although a soldier by education, I have never felt any sort of fondness for war, and I have never advocated it except as a means of producing peace. I always wanted peace, even if I had to fight for it. I hope that we shall always settle our differences amicably, as we did in a recent instance. I believe that that settlement has had a happy effect on both sides, and that from month to month and year to year the tie of common civilization and of common blood is getting stronger between the two countries."

## JOHN BAGNALL &amp; SONS (LIMITED)

issued their report on Thursday last. The capital of the concern is £100,000 in £10 shares, with power to increase to £300,000. The balance against the company at the end of 1875 was £13,761, and the present report details a further loss in the following terms: "The year's working has resulted in a loss of £14,972 16 5, after writing off £3002, 18 3 for depreciation of colliery plant and exhaustion of freehold minerals, and part of debenture interest, £5267, 15 5. This unfavorable result is attributable to the continued extreme depression in trade and the fall in the price of iron, and consequent depreciation in value of stocks. The continuance of short hours of labor and foreign competition have rendered it very difficult to keep the works employed even half-time. The company's property has been kept in a thoroughly efficient state at a cost of £10,330, 14 3, which has been charged to revenue. In accordance with a resolution of the annual general meeting of March 29, 1876,

Major William and Mr. Joshua Fellows were elected members of the board. Your directors have to report that Messrs. Joseph and Edward Naylor resigned the management in August last; Mr. Edward Naylor previously resigned his seat at the board. The directors have appointed Mr. Alfred Jones as manager of the company's works."

The directors of

## THE NANT-Y-GLO AND BLAINA IRON WORKS COMPANY

have just issued an interim report which states that, "although sub-lettings of £6900 per annum have been approved, the company have still retained enough pits to turn out their production of last year—about 400,000 tons of coal. By August 28, in consequence of mortgages falling due, a sum of £145,000 will have to be provided for. Less certain purchases made, and arrangements entered into, this sum will be reduced to £138,022. Certain freeholds and leaseholds, comprising 4978 acres, would have to be charged as security. The income derived from properties named would be annually equal to £13,684, in addition to the minimum rents for sub-lettings—£6900. Rates payable by Messrs. Barnes of 4d. per ton on all coal passed over the company's railway would be £1166, bringing up a total of £21,750; less rent to Lord Abergavenny, £3150, this sum will be reduced to £18,600."

The last named amount, say the directors, is a safe and positive income which mortgagees might receive. The interest on the £18,600 at 5 per cent. would amount to £930, which would leave a balance of £11,700 to pay subsequent charges. The charges are: Second mortgage, £50,000; debentures, £70,000; in all, £120,000. Interest on the former would amount to £2500 at 5 per cent.; on the latter £7000 at 10 per cent.; making £9500, and giving a surplus of £2200, which would be available for expenses. On an improvement in the coal trade the minimum rents would doubtless increase, and the excess would be equal to £3400. The coal raised by the company is estimated to make a profit of 6d. per ton, equal to £10,000; and the value as rent of land on mines is put down at £8000, giving a total of £21,400; £5000 a year should be set apart to redeem mortgages, leaving £16,400, which might go for dividends to shareholders. Other assets and the valuable surface property are also alluded to, as well as the emoluments from the company's private railway. There is an area of 2200 acres still under the company's property. The directors put down the company's misfortunes to losses as manufacturers, the income not having fallen off in any one year. They add: "In the foregoing report no mention has been made of one of the vendors' mortgage, transferred by Mr. Carlton to Mr. Tamplin, amounting to less than £200,000, this mortgage being involved in the company's suit against Messrs. Carlton & Grant for recovering the principal sum of £312,500, the amount received by those parties for promotion money."

THE PRSALL COAL AND IRON COMPANY have also lost £506 on the year's trading, a fact which has so exasperated the shareholders that they have passed a vote of censure on the management, and have appointed a committee of investigation, which will report to a general meeting to be held on July 18th.

## THE NEW ZEALAND TITANIC STEEL AND IRON COMPANY

have recently sent over some of their pig iron, which is made from the sands of New Plymouth Bay, in Taranaki. There are two furnaces belonging to the company, and the pigs which have come to this country are of 78 pounds each. On being tested by the Shelton Bar Iron Company, Stoke-on-Trent, it has been found that the waste was nearly 20 per cent., about 1 ton, 3 cwt. 3 qrs. and 14 lbs. of pig being needed to make one ton of puddled bars. The quality of these bars was excellent, seeing that they bore a tensile test considerably in excess of the Admiralty test of 22 tons per square inch. It is stated that the original cost of the pig in New Zealand is £3. 10/ per ton.

## THE CITY OF BERLIN,

Inman steamer, has now broken down on her passage from New York to Liverpool, and has been towed in by the National steamer Spain. These accidents seldom happen singly. As the immortal William says, "They come not singly, but in battalions."

## THE WEEK'S FAILURES

have not been on a large scale. Among the number have been those of Frederick Brown, of London and Luton (Bedfordshire), iron-founder, with debts set down at £16,000, and Francis Cordwell, carpet manufacturer, Dewsbury, who owes £41,000.

## THE ADMIRALTY,

in order to guard against defects in chain cables, have just issued circulars to superintendents of the dockyards and others in which those concerned are enjoined to retest their chain cables at all possible times when there is a chance. When ships are on foreign stations and no testing machine is available, captains are to endeavor to make arrangements to land the cables in a foreign yard in order that they may be carefully cleaned and minutely examined.

## AMERICAN BEEF

formed the subject of a good deal of contradictory evidence before a Parliamentary select committee last week. A Mr. Lambert, cattle salesman, of Manchester, spoke unfavorably of it, but Mr. Archibald Hamilton, a large flesher, of Glasgow, stated that he got 10,000 pounds of American meat last week, and had dealt largely in it for some time. He had found it invariably good. Mr. Sheldon, a large grazier and dairy farmer in Staffordshire, stated that he had been in America to collect statistics for the Royal Agricultural Society. He found there were in the United States 28,000,000 cattle, 38,000,000 sheep, and 26,000,000 pigs. Allowing the Americans to eat the same as we did—100 pounds per head—they could still spare more than we ate altogether out of their surplus stock. Cattle from Chicago, traveling 1000 miles by rail to New York, were there slaughtered, and were brought over at a cost in all of £4 over the £14 bid for them in Chicago, as against £8. 12, the cost of live cattle from New York. He found the American beef perfectly good, both hot and cold;

it had often been kept several days before being cooked. Trade from New York began in October, 1875, with 136,000 pounds, and gradually increased even through the hot months to April of the present year, when it had reached 6,022,013 pounds. From Philadelphia the trade commenced in October last with 150,610 pounds, and had risen to 25,665,000 pounds in April last. He believed the trade would be permanent.

## SCOTCH PIG IRON

has remained very quiet all the week, and prices have been weak throughout. The stock held in Messrs. Connal's warehouses now reaches 139,867 tons, which is, I believe, the largest quantity for many years. Shipments are not so well upheld, although transatlantic freights are unchanged.

James Watson & Co., writing from Glasgow on June 15, said: "We have to report a very quiet market for Scotch pig iron this week at lower prices, business being transacted in warrants from 54<sup>1/2</sup>, one month, and 53 10<sup>1/2</sup>, cash, to 53 7<sup>1/2</sup>, cash, closing a shade firmer at 53 9 per ton. Shipments last week were 7733 tons against 10,330 tons in the corresponding week of 1876. We quote:

No. 1.	No. 3.
G. M. B., at Glasgow.....	55 3
Gartsherrie.....	55 6
Coltness.....	55 6
Collierville.....	54 6
Langloan.....	56 6
Cairnbroe.....	56 6
Calder, at Port Dundas.....	61 6
Glenegarnock, at Ardrossan.....	60/
Eglinton.....	55 6
Dalmellington, ".....	55 6
Shotts, at Leith.....	60 6
Kinnel, at Bon'ness.....	56 6

John E. Swan & Bros', prices current of the same date gives Coltness No. 1, 65<sup>1/2</sup>; Glengarnock No. 1, 59<sup>1/2</sup>; Eglinton No. 1, 55<sup>1/2</sup>.

The quotations of Wm. Colvin & Co. agree with the foregoing.

## MESSRS. NAPIER'S SHIPYARD,

near Glasgow, which was sold some time ago, is now said to have been bought by the English government for £260,000—said to be a very low price for what is in reality a splendid property.

## THE NORTHUMBERLAND STRIKE

of coal miners has now practically ended. The men were polled as to whether the strike should continue or arbitration be resorted to, and an immense majority voted for the latter proposition. This caused the coal owners to give way a little, hence the dispute is still under the management of the company's private railway. There is an area of 2200 acres still under the company's property. The directors put down the company's misfortunes to losses as manufacturers, the income not having fallen off in any one year. They add: "In the foregoing report no mention has been made of one of the vendors' mortgage, transferred by Mr. Carlton to Mr. Tamplin, amounting to less than £200,000, this mortgage being involved in the company's suit against Messrs. Carlton & Grant for recovering the principal sum of £312,500, the amount received by those parties for promotion money."

## TRADE OF SHEFFIELD.

There is again no change to report in the general condition of the local iron trade and its allied industries, all of which remain quiet. Prices are hardly upheld, except for special brands, and there are symptoms of further reductions taking place before long. In pig iron the week's sales here do not appear to have been at all large, either in respect of forge or foundry qualities. There are still considerable lots of hematite pigs coming into the district from the West Coast, but they are for the most part in fulfillment of old engagements.

The average condition of the local trade was pretty well set forth in a speech made the other evening by Mr. J. Stores Smith, the well known managing director of the Sheepbridge Iron and Coal Company, near Sheffield. After remarking upon the bad state of trade, Mr. Smith said he "wished he could hold out the hope that the bottom of the depression had been reached, but only that very day he had heard of less demand and more lowering of prices than ever. When it was to change he did not know, but he did think it would be a long time before prosperous times came back again, and the return of those times must be through personal economy and hard work." Coming from a gentleman so well known in the trade as Mr. Smith, these remarks will have more weight than any comments of my own, although I may say that what is just recorded fully corroborates the statements which have appeared in these reports for many months past.

Some interesting remarks were also made at the general meeting of the shareholders of William Cooke & Co., Limited, Sheffield, on Friday last. The report showed a loss on the year's working, but the shareholders expressed their satisfaction that it was not heavier in the present state of trade. Several questions were also asked as to the business of the company, relative to which it was stated that the manufacture of spiegelisen had now been given up. As they could sell merchant iron at a profit, the furnaces were being utilized in that direction. When the company was formed their specialty was the manufacture of steel iron. At that time they made 270 to 280 tons per week, whereas in the past year they had only produced 360 tons. All the plant, however, was good, and ready for a revival in trade. Last year there had been a good trade done in spiegelisen, but they had now severe competition. Their Thormanby iron ore mines were raising a large quantity of ore every week. The new hoist mill which had been started during the year was also so far a success.

In the steel rail trade I have no particular change to notice. The two or three works just outside the town, which have for some time been fairly well engaged, are still doing a good business, one of them being said to have orders on the books sufficient to keep the works going on one shift until October. In the town the older rail mills are not busy, to put the matter in a very general way. The armor plate mills and shops are also quite engaged; hence there cannot be "heavy output" which is so constantly reported in other quarters.

On Friday last the firing of a shot in one of the workings of the Kent's thin coal seams at the Aldwarke Colliery of John Brown & Co., Limited, caused some of the brattice props to take fire, and finally resulted in the ignition of the coal seam face. By dint of strenuous efforts, however, continued for a dozen hours, the fire was got under, the seam being filled with 3 feet of water. The fire at the Unstone Silestone Colliery still continues, although shafts have been sealed up. The returns just issued show that during May

the Midland Railway Company carried 140,874 tons of coal to London; the London and Northwestern, 111,613 tons; the Great Northern, 91,167; and the Great Eastern, 67,739 tons. It now appears that the negotiations between the Great Northern and Great Eastern lines are broken off, the Great Northern having declined to guarantee a dividend at the rate of 6 per cent. for a period of ten years from the date of fusion. It is understood that the South Yorkshire Miners' Association will shortly be entirely quit of the unfortunate Shirland Colliery, in the purchase and working of which the association has sunk over £30,000. The land on the surface is now to be sold, the pit having already been in the possession of the new owners for some time. A further meeting of the shareholders will shortly be held for the purpose of receiving the final report of the directors and auditor as to the manner in which the business has been conducted.

The Belper, Derbyshire, horse nail makers have informed the Staffordshire men of the same trade, who are now out on strike, that they—the former—will support them providing they will continue out until a recent reduction of 3d. per 1000 be made good. At present the price paid in both districts is 4 per 1000.

## SHEFFIELD AND AMERICAN MANUFACTURES.

The subject of the relative merits and demerits of your and our manufactures continually crops up in public as well as privately. You may hear people acknowledging the great progress you are making in active competition with us, and the press every now and then warns the public—particularly the "workingman" section thereof—that unless "something is done" Sheffield will sooner or later sink into a condition of decadence which no well regulated mind of the present day can imagine. The Sheffield Telegraph of the other day, for instance, mentions the complaints received from Canada as to the old-fashioned and clumsy goods sent there by our manufacturers, in spite of special instructions and actual patterns to the contrary. For this state of things—which undoubtedly operates to your advantage—the masters blame the trades' unions and the men; while, in turn, the men allege that their employers wish them to make new goods, at prices on which they could not live—hence, their objection to change it all.



**TACKS, LINING,  
AMERICAN TACK CO.**  
HOLSTERS,  
CARPENTER,  
BRUSH TACKS,  
CIGAR BOX,  
FINISHING,  
HUNK AND CLOUD,  
CHAIR NAILS,  
COMMON, CHISEL POINTED, AND COPPER BOAT NAILS.

**SADDLE NAILS**  
SHOE NAILS,  
PATENT BRAIDS,  
AND  
SHOE TACKS,  
BRASS, SILVER,  
AND JAPANNED,  
LINING NAILS,  
NAIL NAILS,  
LUTTIN TACKS,  
TUFTING,  
BUTTONS  
AND NAILS  
OF ALL  
COLORS.

Factory at Fairhaven, Mass. N. Y. Salesroom, 117 Chambers Street.

ANY SIZE OR STYLE OF TACK OR NAIL MADE FROM SAMPLE TO ORDER.

**L. COES'**  
Genuine Improved Patent  
**SCREW WRENCHES.**

Manufactured by

**L. COES & CO.,**  
Worcester, Mass.Established  
in 1839.  
Registered March 31, 1874.**L. COES & CO.**Warehouse, 97 Chambers St., & 81 Beale Sts., N. Y.  
HORACE DURRIE & CO., Sole Agents.

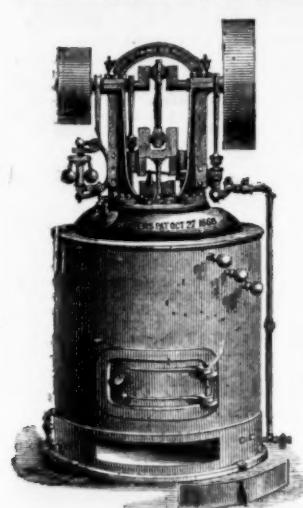
**THE  
Baxter Portable Steam Engine**  
MANUFACTURED BY  
Colt's Patent Fire Arms Mfg. Co.,  
OF HARTFORD, CT.

Awarded First Premium by the American Institute  
successively from 1869 to 1876.  
And the Highest Award at the Centennial Exhibition,  
Philadelphia, 1876.For sale by  
**THOMAS J. FALES**, General Agent,

Office, 18 Park Place, N. Y. P. O. Address, Box 3971.

Sizes from 2 to 15 H. P., which include Engine, Boiler and Furnace, Pump and Governor, Gage Works, Safety Valve, &amp;c., &amp;c., and is equal to an two hours after its arrival at its destination, occupies less space, and consumes less fuel than any other Engine of same Power.

The facilities of the Colt's Patent Fire Arms Manufacturing Co. are unequalled for making these Engines in the most perfect and substantial manner, and they warrant every Machine that leaves their works. For circulars and particulars, apply to

THOS. J. FALES, 18 Park Place, N. Y.  
P. O. Box 3971.**THE HASKINS ENGINE.**

Combined with Boiler, like cut, to 12 H. P.; independent, to 100 H. P.

**OUR GUARANTEE.**

Ten (10) per cent. less fuel than the best. Thirty (30) to fifty (50) per cent. less than the so-called cheap. Fifteen (15) per cent. greater power, size for size. Far greater durability and extreme simplicity, and all this based on the simplest rules of design and method of manufacture.

NOTE.—For steel parts of Rods, Valves, Rods, Connecting Rods, Crank Shaft and all Parts. Best No. 1 Babbitt and box metal Boxes, and only the very best stock in Engines or Boilers. Low prices based on rapid duplication by standard gauges.

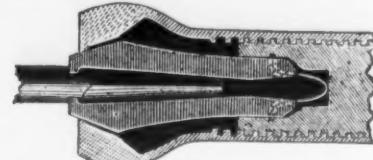
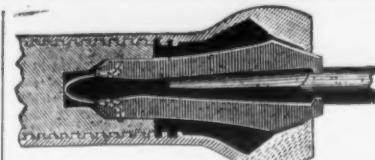
**IN USE ALL OVER THE WORLD.**

All Boilers insured by the Hartford Boiler Insurance Co. free.

The Best is the Cheapest.

**Fitchburg Steam Engine Co.,**  
FITCHBURG, MASS., U. S. A.

In sending for pamphlet, please say where you saw this.



This Cut Represents the Jaws of the Barber Bit Brace.

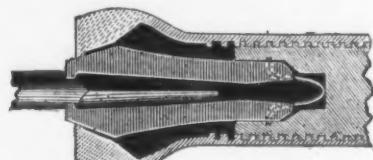
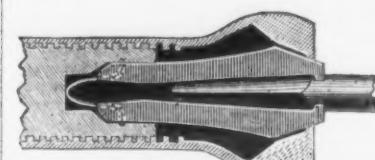
The United States Court recently decided that the Millers Falls Company has the exclusive right to make this style of Brace Jaws, and a higher court long ago decided that they are the only jaws which will hold tools of any size or shape.

All of our Brace Jaws are now made of forged steel, and are nearly indestructible, which is true of no other brace.

We shall make our goods perfect in every respect, and sell them at reasonable prices without trying to compete with inferior goods. We think in the end this will be for the interest of both manufacturers and dealers.

**MILLERS FALLS COMPANY,**

No. 74 Chambers Street, NEW YORK.

**THE EAGLE ANVIL !!****WARRANTED !!**

(ESTABLISHED) 1843.

These Anvils are superior to the best English, or other Anvils, on account of the peculiar process of their manufacture (invented and used only by this concern), and from the quality of the materials employed.

The best English Anvils become hollowing on the face by continued hammering in use, on account of the fibrous nature of the wrought iron—causing it to "settle" under the face.

The body of the Eagle Anvils is of crystallized iron, and no settling can ever occur; the steel face, therefore, remains perfectly true. Also, it has the great advantage that being of a more solid material, and consequently with less rebound, the piece forged receives the full effect of the hammer, instead of a part of it being wasted by the rebound, as of a wrought iron anvil. An equal amount of work can, therefore, be done on this Anvil with a hammer one fifth lighter than that required when using a wrought iron anvil.

The working surface is in one piece of JESSE'S BEST TOOL CAST STEEL, which being accurately ground, is hardened and given the proper temper for the heaviest work. The horn is covered with and its extremely made entirely of steel. The body of the Anvil is of the strongest grade of American iron, to which the cast steel face is warranted to be thoroughly welded and not to come off.

Price List, October 1st, 1876. ANVILS weighing 100 lbs. to 900 lbs. per lb.

No. 00 0 1 2 3 4 5 6 7 8 9

Weighing about 30, 60, 100, 150, 200, 300, 400, 500, 600, 700, 800, 900 lbs.

\$2.25 \$2.75 \$3.25 \$4.00 \$4.50 \$5.25 \$6.00 \$6.50 \$7.25 \$8.25

N. B.—These are the RETAIL PRICES. The only additional cost will be the freight to the purchaser's place of residence.

New York.—Messrs. J. CLARK WILSON &amp; CO.—RUSSELL &amp; ERWIN MFG. CO.—Messrs. HORACE DURRIE &amp; CO. Boston.—Messrs. GEORGE H. GRAY &amp; DANFORTH. Philadelphia.—Messrs. JAMES C. HAND &amp; CO. Baltimore.—Mr. W. H. COLE Louisville.—Messrs. W. B. BELKNAP &amp; CO. FISHER &amp; NORRIS, Sole Manufacturers, Trenton, N. J.

**HOWARD PARALLEL BENCH VISE.**MANUFACTURED BY  
**Howard Iron Works,**  
Send for price list. **Buffalo, N.Y.**  
RUSSELL & ERWIN MFG. CO. NEW YORK & PHILADELPHIA AGENTS.**NATIONAL  
Horse Nail Co.**MANUFACTURERS OF  
**FINISHED**  
(BRIGHT OR BLUED)

These nails are made of the best brands of NOR-WAY IRON, and are guaranteed to be equal to any in the market.

NATIONAL HORSE NAIL CO.,  
VERGENNES, VT  
HORACE DURRIE & CO., Agents,  
No. 97 Chambers St., New York.**Steel Name Stamps.**N. Y. STENCIL WORKS,  
87 Nassau St., New York.WM. J. NICOLLS,  
CIVIL ENGINEER,  
Manufacturers' Agent in  
RAILROAD SUPPLIES  
5 Post Office Ave., Baltimore.

Improved Gem Coal Hods.

Heinz, Pierce & Munschauer,  
Buffalo, N. Y., Manufacturers of  
House Furnishing Goods.

Knowing the wants of the trade for a "Better Article" for use by housekeepers, we have perfected our "GEM" Coal Hod for the trade of 1877; and can now recommend it to our customers as an article that will supply a want long felt. It is the best article of its kind ever made, and is equal to any Hod made elsewhere, either in a grate, fire, or in any kind of a store. Our "Improved Gem" Hod works to perfection in this respect, having a "free" and "easy" discharge of the coal. They are made in five sizes, Japanned, Bronze Band and Galvanized, at the following net prices:

Japanned. Bronze Band. Galvanized.

15 inches, per dozen \$3.75 \$4.50 \$6.00  
16 " " " 4.25 5.50 6.50  
17 " " " 4.75 6.25 7.25  
18 " " " 5.25 6.75 8.00  
20 " " " 7.00 8.75 10.00NET PRICES.  
JOSEPH SCHEIDER & CO., 58 Beekman St.,  
Sole Agents for New York.

Simple, Secure, Elastic, Durable, Convenient to Repair.

\$30 at Chicago for Frog 8 feet long (of Steel Rail).

PENNSYLVANIA STEEL CO., Manufacturers.

216 South 4th St., Philadelphia.

JOHN S. HUNTER, President.

EDWARD J. MURPHY, Sec. &amp; Treas.

The Hartford Foundry & Machine Co.,  
Successors to the WOODRUFF & BEACH IRON WORKS,  
Manufacturers ofMarine & Stationary Engines, Mill Gearing  
Hoisting and Mining Machinery.PUMPING ENGINES, for City and Town Supply a Specialty.  
60 to 98 Commerce Street, HARTFORD, CONN.

## NEWTON &amp; CO.,

Successors to  
PALMER, NEWTON & CO.,  
ALBANY, N. Y., Manufacturers

## FIRE BRICK

## Stove Linings,

## Range and Heater Linings

Cylinder Brick, &amp;c., &amp;c.

## B. KREISCHER &amp; SON.,

## New York Fire Brick &amp;

## STATEN ISLAND

## CLAY RETORT WORKS,

Established 1845.

Office, 600 of Houston Street, East River,  
NEW YORK.

The largest stock of Fire Brick of all shapes and

sizes on hand, and made to order at short notice.

Cupola Brick, for McKenzie Patent,  
and others. Fire Mortar, Ground Brick, Clay and  
Sand. Superior Kaolin for Rolling Mills and Foundries.Stone Ware and other Fire Clay and Sand  
from my own mines at New Jersey and Staten Island,  
by the cargo or otherwise.

## Watson Fire Brick Manufactory

ESTABLISHED 1836.

JOHN R. WATSON, Perth Amboy, New Jersey

Manufacturer of

## FIRE BRICK,

For Rolling Mills, Blast Furnaces, Foundries,  
Gas Works, Lime Kilns, Tanneries, Boiler  
and Grate Setting, Glass Works, &c.

FIRE CLAYS, FIRE SAND, AND KAOLIN FOR SALE

A. HALL &amp; SONS, Perth Amboy, N. J.

ESTABLISHED 1846.

HALL &amp; SONS, Buffalo, N. Y.

ESTABLISHED 1866.

## FIRE BRICK

of reliable quality for all purposes, manufactured of the

best New Jersey Fire Clays. Also, ROCKINGHAM  
WARE, YELLOW WARE, Fire Clay, Fire Sand, Kaolin  
Ground Fire Brick, and Diamantine Building Brick.

MANHATTAN FIRE BRICK

and Enamelled Clay Retort Works.

ADAM WEBER, Proprietor.

Office, 625 of 15th St., N. Y. Clay Retorts, Kaolin  
clay for Gas Houses; Retorts for burning raw bone and  
re-burning bone for Bone Clay, Fire Bricks, Fire  
Blocks, Cupola and Range Bricks of all shapes and sizes.  
The best fire clay from my own Clay Beds at Perth  
Amboy, N. J.HENRY MAURER,  
Proprietor of theExcelsior Fire Brick & Clay  
Retort Works,Manufacturer of FIRE BRICK, HOLLOW  
BRICK AND CLAY RETORTS.

WORKS: PERTH AMBOY, NEW JERSEY.

Office &amp; Depot: 418 to 422 East 23d St., N. Y.

BROOKLYN CLAY RETORT  
AND

Fire-Brick Works,

No. 88 Van Dyke Street, Brooklyn, N. Y.

Edward D. White, surviving Partner of the late firm  
of J. K. Brick & Co.

M. D. Valentine &amp; Bro

Manufacturers of

## FIRE BRICK

## And Furnace Blocks

## DRAIN PIPE &amp; LAND TILE.

Woodbridge, - - - N. J.

## Troy Polishing Works.

## STOVE ORNAMENTS

A Specialty.

No. 7 Sixth Street, TROY, N. Y.

THOS. A. ELGIE, Agent.

Go to BRASS GOODS MFG. CO.,

250 Pearl Street, N. Y., for

Indestructible Business

Silver Trade Dollar

Printed Back Mirror

Gold Back Mirror

Useful beside being

Also all kinds of Press or Die work done cheaply,

satisfactorily, promptly and well.

STEAM  
PUMPS

Manufactured by

Cranes Bros. Mfg. Co.

CHICAGO.

COOKE &amp; BEGGS, Agents

16 Cortlandt St., N. Y.

## PATENTS.

F. A. LEHMANN, Solicitor of Patents, Washington,  
D. C. No Patent, No Pay. Send for circular.

## HOWSONS'

OFFICES FOR PROSECUTING

UNITED STATES AND FOREIGN  
PATENTS,

Forrest Buildings,

119 SOUTH FOURTH ST., PHILADELPHIA.

AND MARBLE BUILDINGS

605 Seventh St. (Opposite U. S. Patent Office,

Washington, D. C.

H. HOWSON, C. HOWSON,  
Solicitor of Patents. Attorney at Law.

Communications should be addressed to the

PRINCIPAL OFFICES, PHILADELPHIA

## CUMBERLAND FIRE BRICK WORKS

Gardner, Stuart &amp; Co.,

Manufacturers of

## STANDARD SAVAGE FIRE BRICK.

OFFICE: Room 3, No. 96½ Fourth Ave.,

PITTSBURGH, P.A.

WORKS: One mile from Mt. Savage Junction,

Md., B. &amp; O. R. R.

Illustrated Circulars and Price Lists on application.

## PATENTS.

THOS. D. STETSON,

No. 23 Murray St., N. Y.

Solicitor of Patents, and

Scientific Expert in

patent cases. Send for circular.

## TROY FIRE BRICK WORKS,

Jas. Ostrander &amp; Son,

Established 1848.

Manufacturers of

## FIRE BRICK.

Tuyeres, Tiles, Blast Furnace Blocks, etc.

Miners and Dealers in

Woodbridge Fire Clay and Sand,

and Staten Island Kaolin.

Price List, Diagrams of Fire Brick,

and all other information cheerfully

furnished on application.

TROY, N. Y.

JAMES OSTRANDER,

FRANCIS A. OSTRANDER, surviving

partner.

## Brick Presses,

The Largest Establishment of the kind in the U. S.

F. L. &amp; D. R. CARNELL,

544 Germantown Avenue, Philadelphia.

Manufacturers of Pennsylvania Brick Machine  
Little Giant Pipe Machine, Fire and Red Brick  
Presses, Clay Wheels, The Machines, Stampers,  
Grinding Pans, Brick Yards fitted out for running  
by steam or horse. Heavy and Light Castings. Send  
for circular.

## FOUNDERS AND FURNACE MEN:

FOR

## PURE CONNELLSVILLE COKE

Send your orders to

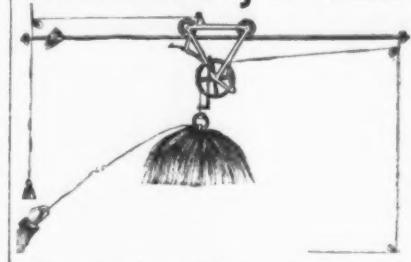
## H. C. FRICK,

Box 242. WORKS at Broad Ford, Pa.

(Near Connells, Pa.)

Special attention given to the  
Manufacture of Coke for Foundries, Malleable  
Iron Works, &c.

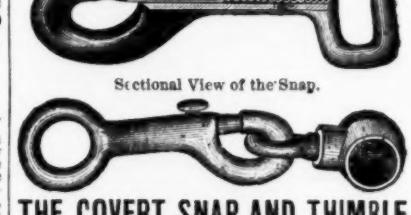
## American Hay Elevator



The most perfect and simple, and the only elevator that raises the hay from wagon and carries it back to the barn any distance required. It can also be used in stores, &c. This elevator received the highest award at the Centennial field trial. Price, \$12, with large discount to the hardware trade. Manufactured by the Patentee.

J. R. FITZHUGH,  
1708 Barker St., Philadelphia.

The Cheapest and most  
Durable Paint known for  
Roofing, Bridges, Iron,  
Brick, Wood, Buildings,  
etc. All Paint guaranteed  
as represented, and  
trial orders solicited.

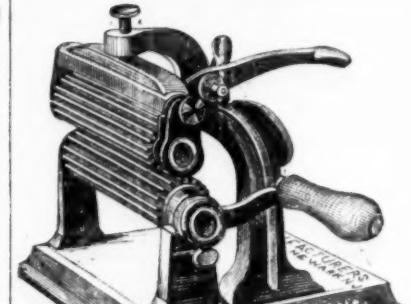
Pittsburgh  
Iron Paint Co.,  
PITTSBURGH, PA.

For Horse and Cattle Ties.

If you want the best at reasonable prices, send for  
illustrated circulars and prices of the Calculated

Covert Harness Snap, Horse and Cattle Ties, Breast  
Chains, Halter Chains, Post Chains, Rein Chains, &c.

These goods are sold by all leading jobbers in  
General and Saddlery Hardware. Sample Snap sent  
free of charge if desired. Address

HOLD BACK AND SNAP CO.,  
Sole Manufacturers, Troy, N. Y.KNOX AND IMPROVED KNOX  
FLUTING MACHINES.

\$1.40; 6 in., \$2.00; 4 in., \$2.25.  
Extra Rollers.—8 in., \$2.25; 6 in., \$1.50; 4 in., \$1.25.

Flutes.—10, 12, 15, 18, 21, 24, 27 & 30, less discount.

H. SAUERBIER & SONS,  
40 & 42 Mechanic St., Newark, N.

LEFFERT'S  
ENAMEL WORKS,

417 W. 24th St., N. Y.

Signs, Door, Number and Finger plates enamelled in  
any color and decorated in any style.

Illustrated Catalogues furnished on application.

Plumbers' Materials, and every description of Wrought  
and Cast Iron Work enamelled to order.

## THE AMERICAN MACHINE COMPANY, Philadelphia, Pa.,

MANUFACTURERS OF

## SPECIALTIES OF LIGHT IRON WORK.



CROWN WRINGERS.

with Patent White Rubber Rolls, Galvanized Malleable Iron Frame Work, Bessemer Steel Springs, &c. Noted for Strength, Durability, Efficiency and Simplicity.

No. 2, Rolls 1½ in. diam., 10 in. long. No. 3½, Rolls 1½ in. diam., 12 in. long.

No. 3, Rolls 1½ in. diam., 15 in. long. No. 4, Rolls 2 in. diam., 12 in. long.

with valuable improvements over other style Machines. Patent Spring Arrangement and Clamping Device. Noted for Superiority of Finish and Practical Advantages. The leading Machine in the market.

Sizes (length of Rolls), 4½ inch, 6 inch and 8 inch.

Rolls with 10, 12, 15, 18, 22, 26 and 30 flutes.

WORKS at Valley Falls, R. I.

Manufacturers of

PERKINS and RHODE ISLAND PATTERNS OF

HORSE AND MULE SHOES.



For sale by the Hardware and House Furnishing Stores.

## Henry Meiggs.

The papers announce that Henry Meiggs, "the South American Railway King," has just made new contracts for public works in Peru, and some of the most remarkable projects of engineering in the world are consequently to be pushed to completion. Meiggs is one of the most interesting specimens of American enterprise in existence. His life is a romance. Thirty years ago he was a respectable citizen of New York, best known, perhaps, as a patron of music. He went to California in the early days of the gold excitement, and made a fortune there, not by digging, but by trading. He became a prosperous dealer in "lumber," having sawmills in the back country, and a large establishment in the city of San Francisco, where he was elected a member of the municipal council. Great quantities of heavy planking were used there as the city began to grow; it was employed instead of pavement, and bought for the construction of sewers also; and to pay for it, the labor expended on it, the city government used to issue scrip in sums of one hundred, five hundred, one thousand and five thousand dollars. The scrip was popular; it was a favorite collateral for loans, and so the lumber-business became one of the great interests of San Francisco, and the foundation of a great many commercial fortunes. One morning, in 1854 or 1855, Meiggs was missing. He had gone aboard a schooner of his own, with his whole family, stowed the hold with every fragment of property that he could carry away, stripping even the furniture from his house and the ornaments from his parlor mantel, and, unsuspected, had dropped quietly down the bay and sailed for South America. He left behind about a million dollars of liabilities. Then it was discovered that he had made use of his position as a member of the city council to issue quantities of fraudulent scrip. The paper was adjudged a forgery, but it was not really that; it was properly signed, but dishonestly issued. There was, of course, a panic, and a series of failures, lasting two years, in the course of which all the lumber dealers in San Francisco went down.

Meanwhile the fugitive, carrying such luggage as surely no abounding bankrupt ever took with him before, was wafted gaily over summer seas, and when the world next heard of him he was one of the richest men of Peru. When Henry Meiggs first made his appearance in Peru, he was already favorably known as a contractor from having concluded important railway works in Chili, and had become naturalized in that country. The first contract in Peru was signed in 1863, under the Government of General Pedro Díez Causco, and was for the line from Mejia to Arequipa. In 1870 the Peruvian Congress, having approved of the emission of bonds for a loan of 300,000,000 francs, the construction of railways was commenced at once on a large scale, and Mr. Meiggs became contractor general, and having received large advances from the State, bought up for ready cash all the concessions for railways that had already been granted. And now a somewhat similar scene occurred in Peru to that which was witnessed in England during the railway fever. Engineers sprang up on all sides; every one whose acquirements enabled him to set out a curve more or less correctly and run a level with an error that did not exceed a few yards, found employment in that capacity. Captains and mates of merchant ships were given charge of a section, and any one who wore long boots and rode on a California saddle was dubbed "al Señor Yngeniéro." One of these worthies being allotted as an assistant to the chief engineer to one of the railways, was ordered by him to take some levels, and provided with an instrument for the purpose, which, however, he shortly returned, stating that "the darned thing was out of order, and showed everything upside down."

However, this sort of thing could not last, and the bogus engineers were soon weeded out and capable men put in their place; and so far from there being anything to criticize in the generality of the Peruvian railways, the wonder is how they were traced or made at all.

Every one who has visited any of the railways constructed by Mr. Meiggs must acknowledge both the perfect manner in which the work is done and the courtesy and attention shown to all visitors by Mr. Meiggs' employees, who, although of many different nationalities, are all alike on one point, and universally extend their hospitality to all who desire to inspect the works under their charge.

Mr. Meiggs paid his debts in San Francisco. He made such honest reparation for his delinquencies that the Legislature of California passed a special act to relieve him from the consequences of his wrong-doings, and if he chose to go back there now he would be received with open arms. But the tales of his fabulous wealth were greatly exaggerated, for it appears that he exhausted his money in his railway enterprises, and about a year and a half ago he was obliged to suspend the works for want of means. Now, however, he has formed a company of Americans and Peruvians to complete the undertakings; engines, wagons, and other material have been purchased in this country, and engineers and contractors are going out to Peru at once. Meiggs has already completed four railways, at a cost of about \$55,000,000, and his present plans embrace three more, all of which are under way.

Mr. Meiggs himself has a reputation in Peru for charity and generosity such as is extended to few, and wonderful stories of his liberality are related in that country. His moderate conduct while exhausting his funds during the non-payment of the large sums due to him upon his contracts by the Peruvian government, has made him many new friends in that country, who will rejoice at the prospect of the extension of the branch line from the Oroya Railway to the far-famed silver hill (Cerro de Pasco), which has now been arranged and is being proceeded with. These ancient and rich mines are now in decadence, owing to their being flooded and the miners not commanding capital enough to drain them. They therefore confine themselves to getting what ores they can above water level, and the output is in consequence very much reduced. There

have been steam pumping engines in Pasco for a long time past; indeed, Trevethick spent many years of his life there, but the body of water is too great to be dealt with in this way, and it has been determined to open a drainage tunnel which, when completed, will leave an enormous amount of ore available to repay its cost.

This is hardly a speculation; it is almost a certainty, as the ore is known to be there, and the expense of the tunnel is easily calculated. In fact, it is said there is not an atom of soil in Pasco that does not contain some silver; even the abode of which the houses are built contains 4 marks to the cajon (600 lbs.). The construction of the branch railway will facilitate the transport of the necessary materials and tools and the employment of modern machinery and metallurgical skill and knowledge, instead of the rude Spanish *arrastras* and rule of thumb work, cannot fail to mark the commencement of a new era for this part of Peru. The government has at last agreed to Mr. Meiggs' terms for undertaking these works, and they are now being put in hand. Peru is a name that does not sound pleasantly just now among us, but the last few years have seen a wonderful advance in that country. For the last ten years there has not been a successful revolution; in many instances the people have voluntarily assembled to protect the cause of order, and habits of morality and industry are more and more the rule, and public opinion is stronger and condemns more firmly those who evince a desire to prosper at the expense of a disturbance of the government of the time. The capital has been greatly benefited by the operations of Mr. Meiggs, who, during the government of Don José Balta, purchased the zone of ground occupied by the ancient fortifications, and has transformed that dusty precinct into shady Alamedas, bordered on each side by most valuable building lots. He has also purchased a considerable extent of land between Lima and Callao, adjoining the new railway, and the plans are prepared, and have been on view for some time at the office of the Obras Públicas Company, for laying this out in parks, gardens and villa residences, and so connecting the port and the capital.

Mr. Meiggs' career has been a most extraordinary one, and the claim that he scarcely has a personal enemy argues wonderful tact and temper in dealing with those who come in contact with him. We wish him every success in his new undertaking.

## Bessemer Steel Ship Plates.

BOLTON, LANCASHIRE, England, May 29, 1877. To the Secretary of the American Iron and Steel Association—SIR: We beg to thank you for the copy of the *Bulletin* you have been kind enough to send to us, containing an article on steel shipbuilding extracted from the *London Times*, and also a portion of a letter we wrote to the editor of that journal, as we considered his article was calculated to mislead the public by the implied superiority conveyed in it of steel made by the Siemens process over that made by the Bessemer process, more especially in reference to steel plates for shipbuilding, and also that it is entirely due to the Siemens process that the Admiralty are now enabled to supply themselves with a quality of steel specially suited to their requirements in the building of vessels of war. We may further state that we think the *Times* article gives an erroneous impression as to the use of steel for shipbuilding in the early days of its manufacture by the Bessemer process, as our firm commenced to manufacture steel plates for that purpose in the autumn of 1863, and in about two months supplied at least 1000 tons to various shipbuilders, and we have since then continued to supply it regularly for the construction of vessels where a light draught of water is an object. The vessels built of this material gave most satisfactory results, and withstood the effects of accidents in a most extraordinary manner.

In 1866 we obtained our first order from the Admiralty, and have continued to supply the government dockyards regularly since that date with steel plates and angles to be used in the construction of iron-clads. It was specified that the steel to be used for this purpose must possess a minimum tensile strength of 33 tons and a maximum of 40 tons per square inch, but it was found that punching had so injurious an effect on steel of this strength that its use would be extremely limited unless some means could be found of overcoming this defect; this led us to make a number of experiments, and in May, 1867, we discovered that annealing the plates after punching restored the steel almost to its original strength. This fact was communicated to our government, who confirmed it by experiments which you will find in the pamphlet on the "Treatment of Steel Plates," herewith mailed you. We may here remark that we consider the use of steel for constructive purposes has been very much retarded by engineers asking for a material with too high a tensile strength, as specifications for thousands of tons have passed through our hands requiring steel plates to stand a tensile strain of 40 tons per square inch for a quarter of an hour without fracture, and for which we invariably declined to tender.

In 1875 a demand sprang up for steel for shipbuilding of so mild a quality that when struck by shot it would not star or splinter, and our firm was the first to be able to supply it. The sample plates made by the Bessemer process possessed an average tensile strength of 28 tons per square inch, with an elongation of 1/8 inches in 6 inches, or over 20 per cent., and strips cut from each plate, after being made red-hot and slackened in cold water, were bent cold without showing any signs of fracture, to a curve the inner radius of which was 1/2 times the thickness of the plate, and we have had thousands of plates tested in this manner by government and other inspectors without a single failure. The injury sustained by this steel in punching is also much less than the stronger steel previously alluded to, as experiments have shown.

In the paper that Mr. Riley read before the Institution of Naval Architects, in 1876, he ought to have stated that he was comparing Landore steel, made under a specification limiting the tensile strength between 26 tons and 30 tons per square inch,

with Bessemer steel made under a specification which demanded a minimum tensile strength of 33 tons, with a limit of 40 tons per square inch, and although there had been a series of tests simultaneously made on Bessemer steel supplied under the same specification as the Landore steel, and which gave in every respect at least as good results as the Landore steel, he did not refer to them. We send by book post the paper on the "Treatment of Steel Plates" and "Results of Experiments on Riveted Joints and Steel Plates," which we think may be of interest. We are, sir, yours, very truly,

THE BOLTON IRON AND STEEL COMPANY, LIMITED, per HENRY SHARP, General Manager.

## Resolutions of Sympathy.

At a meeting of the Table Cutlery Manufacturers' Association, held at Beaver Falls, Pa., June 26th and 27th, the secretary was instructed to forward to the family of the deceased, and to have published in *The Iron Age* and in the *Manufacturer*, a copy of the following paper:

Whereas, It has pleased our Heavenly Father in His wise Providence to remove from this world a very highly esteemed member of this Association, Mr. Joseph B. Beadle, a man whose record amongst men was faultless, and whose Christian character was such as to prompt to a better and purer life those with whom he was brought in contact, who, suffering for years from an incurable disease, accepted with cheerful resignation the chastening hand of a loving Father; therefore,

Resolved, That the members of this Association, recognizing the worth of so valued an associate, and deeply feeling the loss we have sustained in his death, hereby express our admiration of his Christian character and our appreciation of his worthy example; and that we hereby tender to his widow and family the assurances of our sincere sympathy in their great affliction.

R. H. JOHNSON, Secretary.

The Pennsylvania Railroad.—Meeting of English Stockholders.—The *London Times* contains a full report of the proceedings of the meeting held in London, June 15, of English shareholders of the Pennsylvania Railroad, at which Mr. Edmund Smith, the second vice-president, made a statement of the company's affairs, and a resolution was passed asking for fuller statements of its accounts, and appointing a committee to confer with the Board of Directors on the subject. The *Times*, commenting upon the meeting, says: Some important statements, calculated to reassure the public, were made to-day at the meeting of Pennsylvania Railroad shareholders by Mr. Edmund Smith, vice-president of the company. What will satisfy them most, perhaps, is his assurance that it is no part of his business here to try and raise more money for the line. A rumor to that effect had been rather prominently circulated and was causing some uneasiness, for nothing could well be more inopportune than such an attempt just now. Another satisfactory feature was the willingness shown by Mr. Smith to entertain the propositions made by the English shareholders relative to traffic statements and fuller accounts. Nothing will conduce more to sustain the credit of American railways than periodical statements of income and expenditure and annual or semi-annual accounts and balance sheets drawn up on English models. There must be an end of subsidiary companies used as mere receptacles of the waste matter produced by inordinate railway competition. Everything ought in future to be made plain to the most ordinary understanding.

The Athens correspondent of the *Deutsche Industrie Zeitung* writes that the manufacture of iron, which was begun a few years ago by a metallurgical association in Athens, has been abandoned because of the scarcity of stone coal, although brown coal is abundant in Greece. The writer suggests that German iron makers could purchase iron ore in the island of Seriphos at very low prices. These ores are brown hematite, red hematite and specular ore, which can and will yield 25 to 30 per cent. of metallic iron. These beautiful ores can be bought for ten francs (\$2) per ton. One deposit of these ores is calculated at 500,000 tons, and the island thus rich in iron ore has been named "Sidera Nesos," or Iron Island.

From the Bloomfield mines, in Bedford and Blair counties, and which belong to the Duncan estate, the Pennsylvania Railroad, during the month of May, shipped 7,436,050 pounds of iron ore. These ores are employed in the manufacture of Bessemer steel, and during the rebellion were used in making the famous Rodman guns. The Pennsylvania Railroad is fostering these mines, which owe their development to the industry and business foresight of Major John W. Duncan, of Pittsburgh. Recently a number of improved washers have been introduced that will increase the production of ore more than one-half.

## SPECIAL NOTICE.

The undersigned offer their services as agents to American Producers of Metals.

They represent foreign brands of

Zinc, Russia Iron, Hoop Iron, Window Glass, Cutlery and Guns.

LOUIS WINDMULLER & ROELKER,

20 Beale Street, N. Y.

Important to Manufacturers.

BISSELL, WELLES & MILLET,

Auctioneers and Commission Merchants, No.

15 Murray St., New York.

Solicit from Manufacturers and others consignments of Hardware and Cutlery for our weekly Auction Sales to the Trade, or at private sale for cash, as desired. Our facilities for moving large quantities of goods are unsurpassed. Advances made if desired.

## DROP FORGINGS.

The TRENTON VISE & TOOL WORKS, Trenton, N. J., having increased their facilities, are now able to do all kinds of

Iron and Steel Drop Forgings

in quantities to order at reasonable rates.

HERMANN BOKER & CO., Proprietors,

101 & 103 Duane St., N. Y.

Or WICKERSHAM & CO., Gen'l Agents, 403 Library St., Phila.

## Ramsey's Car Truck

## Shifting Apparatus.

The advantages gained by using Ramsey's Car Truck Shifting Apparatus, are as follows:

1st.—The power required to run a car on the level track is sufficient to separate the trucks from a car body.

2d.—It avoids twisting or straining the car frame.

3d.—The manufacturing cost of this Shifting Apparatus will not exceed one hundred dollars. And each one is capable of doing more work with less labor than any other truck, without the assistance of an extra Steam Engine, or a Steam Hoist, costing two thousand dollars.

At each one of the principal stations where car wheels are regularly tested to see how they stand the journey, a switch is placed, having a depression or pit about eighteen inches deep, with gentle inclines at each end, and on each side a narrow track, remaining on the level, upon which is small but strong truck, which carries a car, surmounting beams or cross-bars connecting from one to the other across the pit, for the purpose of bearing the car body, while the trucks run down the incline rails to the white.

A Working Model of this Apparatus is on exhibition at

220 S. Fourth Street, Philadelphia, Pa.

Communications may be addressed to

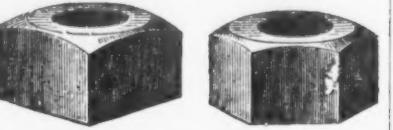
RAMSEY & SCARLETT, as above, or to

Box 162, Cobourg, Ontario, Canada.

See *The Iron Age* of Sept. 7, 1876.

## NEW HAVEN NUT CO.

MANUFACTURERS OF



Hot Pressed Square and

Hexagon

## NUTS.

Post Office Address, Westville, Conn.

## HAGSTOZ &amp; THORPE,

MANUFACTURERS AND SOLE

AGENTS FOR

Russell's

Patent

## PARALLEL PLIERS.

LEDGER BUILDING,

Sixth and Chestnut Sts., PHILADELPHIA.

Established 1838.

Bevin Bros. Mfg.

Co.,

Easthampton, Ct.

Manufacturers of

SLEIGH BELLS.

House, Tea, Hand,

Gong Bells, &c.

Bell Metal Kettles.

## Lester Oil Co.,

51 MAIDEN LANE, N. Y.

Exclusive manufacturers of the Renowned

## Synovial Lubricating

OILS.

The most Durable, Reliable & Econ-

omical Lubricant in existence;

Applicable to every class of machinery. Send for Cir-

cular and Price List.

JACKSON & TYLER,

16 German St., Baltimore, Md.

ALSO

## REVOLUTION

INDICATORS.

which constantly indicate without the use

of a watch, the number of turns per minute

made by a Steam Engine</

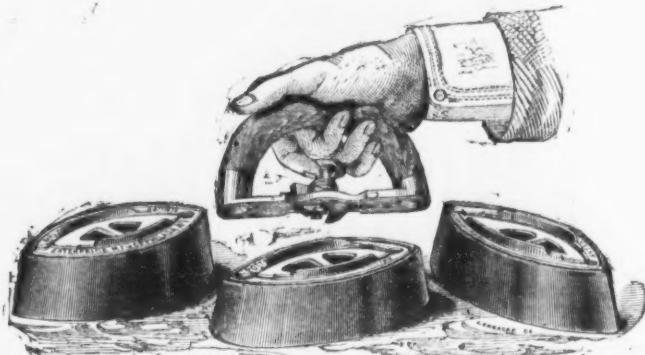
# ENTERPRISE MANUFACTURING COMPANY, of PA.

## OFFICE AND WORKS,

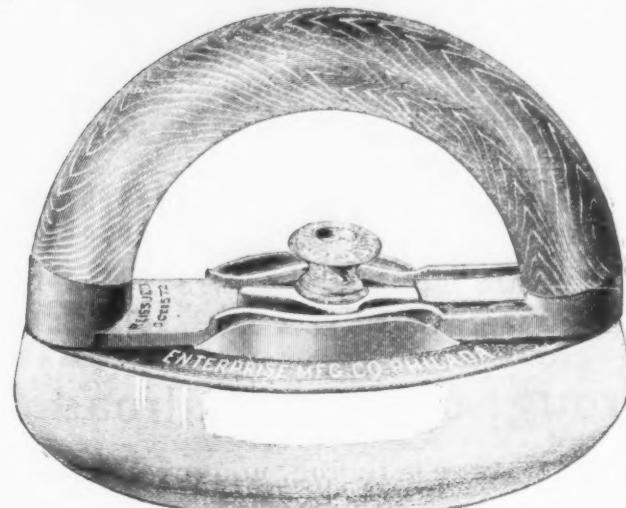
## S. W. Corner American & Dauphin Sts., PHILADELPHIA.



Star Smoothing and Polishing Irons, Patent Ground.



Enterprise Cold Handle Double Pointed Smoothing and Polishing Irons, (Mrs. Pott's Patent).



Chinese Polishing Iron.

**WE MAKE :**  
Mrs. Potts' Cold Handle  
Double Pointed

### SMOOTHING and POLISHING IRONS.

They have a Polished Walnut Handle. They do not burn the hand. They heat quicker, and retain the same longer than other irons. They are lined with non-conducting fire cement. They are ground by patented machinery. They are handsome, serviceable and cheap. They have no equal.

Send for Illustrated Catalogue and Price List.



Enterprise Cold Handle Double Pointed Smoothing and Polishing Irons, Girls' Size.



Champion Tobacco Cutter.



No. 10, Coffee and Spice Mill.



No. 3, Coffee and Spice Mill.



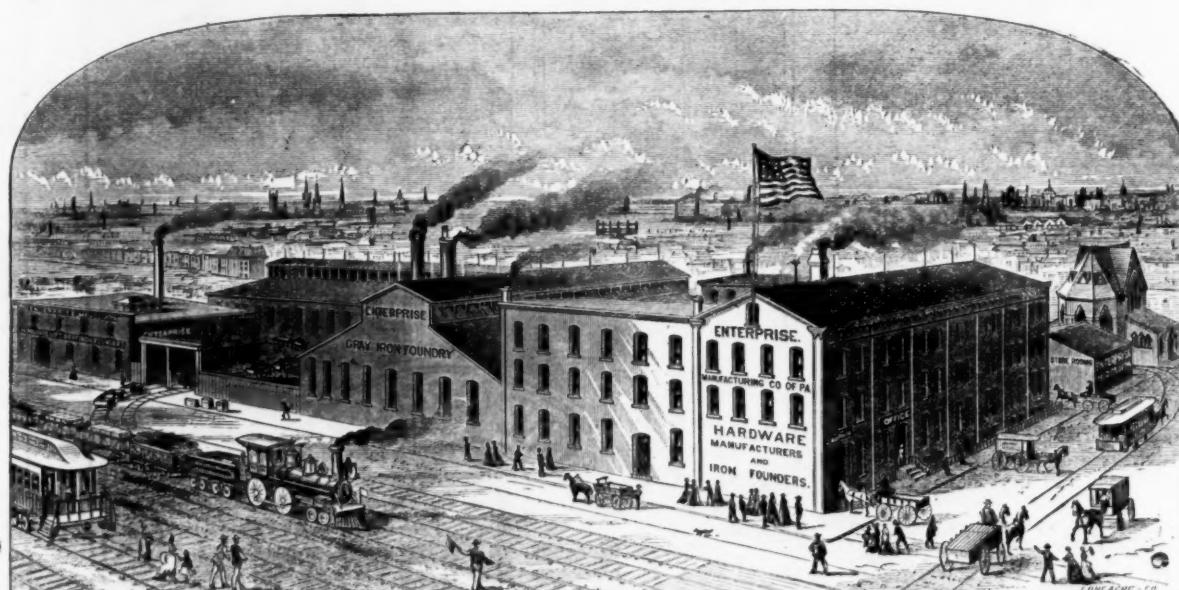
No. 18, Coffee and Spice Mill.

**WE MAKE**  
American Coffee, Spice  
and Drug Mills,  
Sausage Stuffers,  
Fruit, Lard and Jelly  
Presses combined.  
Tincture Presses,  
Self-Measuring  
Faucets, Champion  
Tobacco Cutters,  
Self-Weighing  
Cheese Knives,  
Bung Hole Borers,  
OR  
Hollow Augers.

Send for Illustrated Catalogue and Price List.



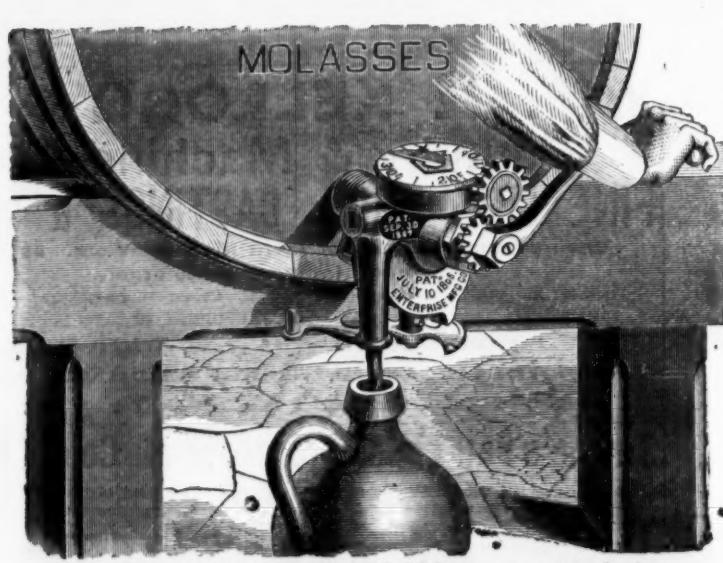
Self-Weighing Cheese Knife.



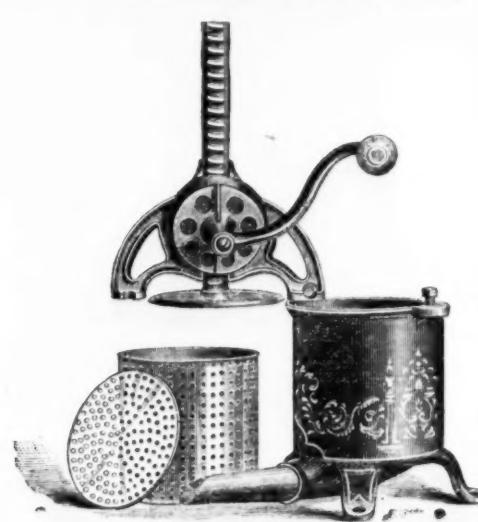
VIEW OF WORKS.



Sausage Stuffer, Fruit, Lard and Jelly Press combined, (Shut.)



Self-Measuring Faucet, 250,000 now in actual use.



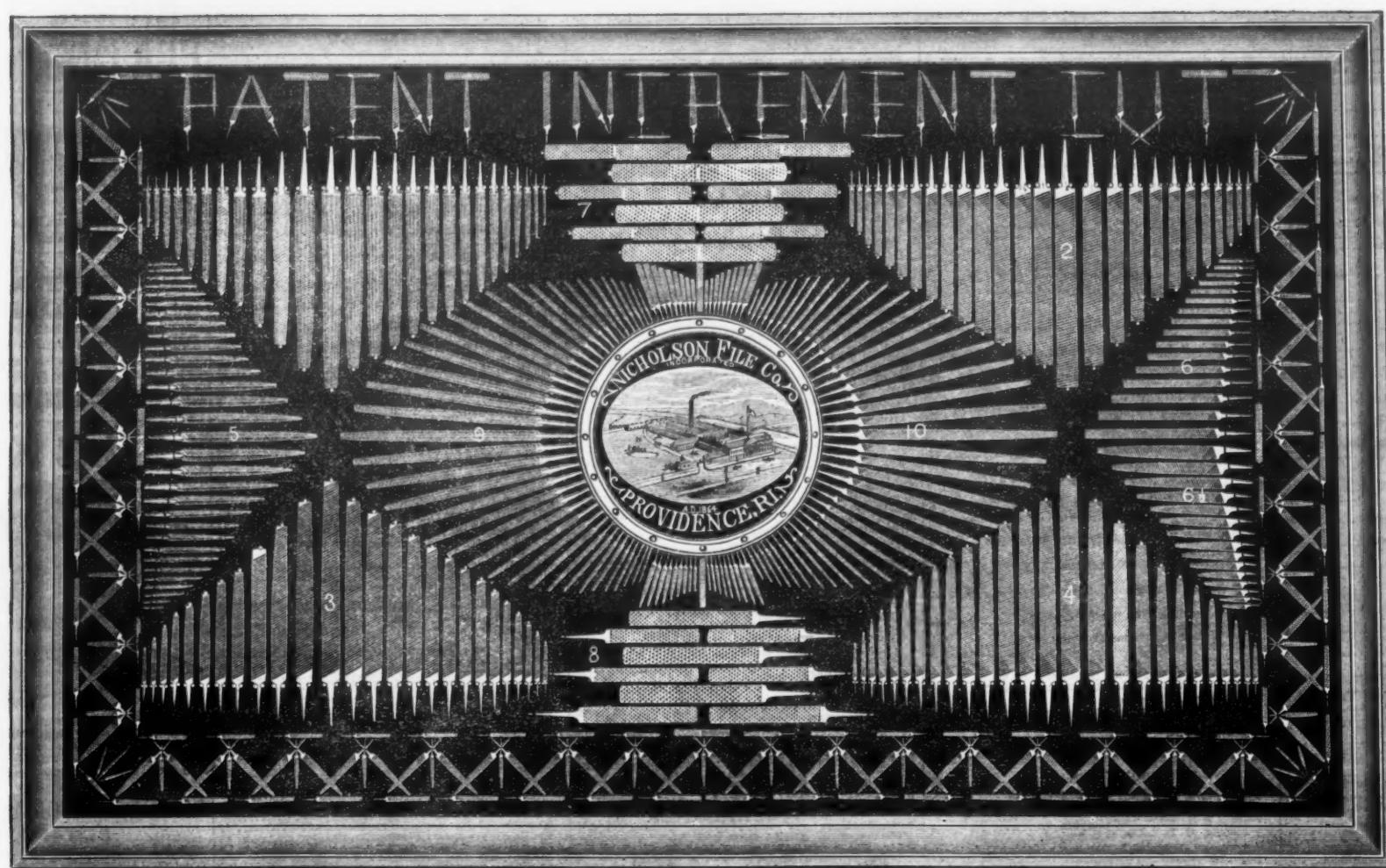
Sausage Stuffer, Fruit, Lard and Jelly Press combined, (Open.)





# NICHOLSON FILE CO.,

## Providence, R. I.



### KEY.

1.—Half Round.	4.—Flat.	6½.—Knife.	9.—Round.
2.—Hand.	5.—Triangular.	7.—Plain Rasps.	10.—Square.
3.—Mill.	6.—Pillar.	8.—Tanged Rasps.	11.—Borders.

In addition to above we manufacture

## FILES AND RASPS

of every description and kind known to the trade.

These goods are not excelled, and by a large proportion of both **Consumers** and **Dealers** are admitted as superior to any either of **Foreign or Domestic Manufacture.**

We are constantly improving and adding to our machinery, and by carrying a stock of from 30 to 50,000 dozen Files on our shelves at all times, we are enabled to fill orders with the utmost dispatch, thereby saving both loss of **Trade** and **Interest** to our customers.

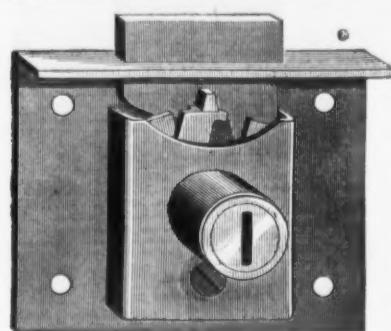
For several months past we have been engaged upon a **Catalogue** and **Treatise**, illustrative of the **File and its Uses**, which we hope soon to have ready for distribution. In this work we expect to introduce several new and important appliances connected with the uses of the File.



# New York Wholesale Prices, July 3, 1877.

## HARDWARE.





List Price, - - \$8.50 per dozen.

**A NEW  
Drawer Lock.  
THE  
"STANDARD."**

Applicable also to Cupboards, etc.

Made wholly of Brass, and finely finished. Each Lock has two flat, steel, nickel-plated Keys.

Dealers desiring to examine this Lock will receive a sample without charge, by addressing

**The Yale Lock Mfg. Co.**  
STAMFORD, CONN.

**The Famous Improved  
SHEPARDSON LOCKS**  
Are the "Best" in the World.  
**The United States Lock Co.**,

Office and Manuactory, KINGSTON, MASS.

**WM. F. DONOVAN**, General Manager.  
NEW YORK OFFICE, 97 Chambers Street.

**BAEDER, ADAMSON & CO.**,  
Manufacturers of SAND & EMERY PAPER & EMERY CLOTH.

(Also, in Rolls for machine work.)

Ground Emery, Corundum & Flint, Glue & Curled Hair, Hair Felt, & Felt-  
ing for Covering Boilers, Pipes, &c., Cow Hide Whips.

Stores: NEW YORK, 67 Beekman St., BOSTON, 143 Milk St., CHICAGO, 182 Lake St.

ESTABLISHED 1826.

**C. S. OSBORNE & CO.**,  
Manufacturers of SADDLERS' AND HARNESS MAKERS'  
TOOLS.

No. 96 Mechanic St., NEWARK, N. J.

**Ludlow Valve Mfg. Co.**,  
OFFICE AND WORKS:

938 to 954 River St. & 67 to 83 Vail Ave., Troy, N. Y.  
**VALVES**

(Double and Single Gate,  $\frac{1}{4}$  in. to 48 in.—outside and inside Screws, Indicator, &c.)  
for Gas, Water and Steam. Send for Circular.

Also FIRE HYDRANTS.

J. S. PROUTY, Pres.  
**Prouty Hardware and Manufacturing Co.**,  
Wholesale dealers in  
**FOREIGN & DOMESTIC HARDWARE, &c., &c.**  
Agents for Amwaeke's Scandinavian or Jail Locks.  
A large lot of Birmingham Shovels at job prices.  
Agents for **ERIE LAWN MOWERS**.  
No. 53 Beekman Street, New York.

DOOR FRAME.

**"TORREY'S DOOR SPRINGS"**  
P. R. DUNNIE,  
Successor to E. S. & J. TORREY,  
SOLE MANUFACTURER,  
182 Fulton St., New York.



AND  
Ice Cream Freezers.

**FAC-SIMILES**  
OF THE



**Centennial Award Medal**  
Executed on Glass "en Béte," for outside show, from  
8 to 24 in. diameter, by the

Otto Stietz N. Y. Glass Letter Co.,  
611 Broadway.  
Advertising Glass Signs a specialty.

**The Diamond Drill**  
FOR  
**PROSPECTING LANDS**  
Produces Cylindrical Sections, or Cores,  
the whole distance bored.

A TRUE RECORD GUARANTEED.  
PRICES REDUCED.

Artesian wells bored round and straight. Deep  
blast-holes bored for sinking shafts and driving  
timber by the new process. Prospecting Drills  
and Improved Diamond Quarry and Channelling  
Drills made and sold with right to use.

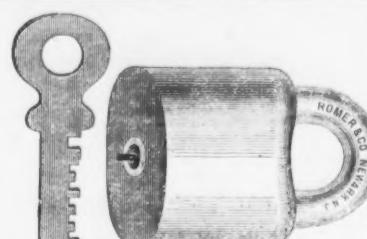
MADE BY THE  
**FLORENCE SEWING MACHINE CO.**  
FLORENCE, MASS., Manufacturers of  
**THE BEST SEWING MACHINES.**  
General Agencies—59 Union Square, New York.  
470 Washington St., Boston; 66 Lake St., Chicago.  
Agents wanted everywhere.

**THE FLORENCE OIL STOVE.**  
For Heating or Cooking.  
**TWO STOVES IN ONE.**  
Safe,  
Odorless and Durable.  
Can be used without chimney-flues, as it generates no smoke or noxious gases.  
Meats and Bread cooked by this stove are better flavored and more digestible than when cooked by coal or wood.  
**THE HEATER** furnishes an abundant supply of pure, moist heat, easily regulated to any desired temperature.

The FLORENCE received the only Centennial Medal awarded to Oil Stoves. Report of the Judges: "It is simple in construction, easily managed, and well adapted to its intended purpose."

MADE BY THE  
**FLORENCE SEWING MACHINE CO.**  
FLORENCE, MASS., Manufacturers of  
**THE BEST SEWING MACHINES.**  
General Agencies—59 Union Square, New York.  
470 Washington St., Boston; 66 Lake St., Chicago.  
Agents wanted everywhere.

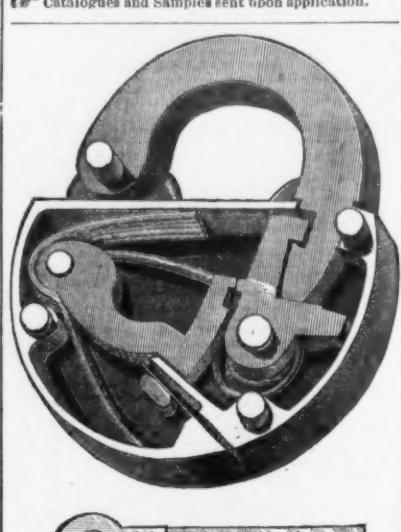
**PENNA. DIAMOND DRILL CO.,**  
Pottsville, Pa.



**ROMER & CO.**  
Established 1837. Manufacturers of Patent Scandinavian or Jail Locks, Brass Pad Locks for Railroads and Switches. Also, Patent Stationary R. H. Car Door Locks. Patent Piano and Sewing Machine Locks. 141 to 145 Railroad Avenue, NEWARK, N. J. Illustrated Catalogue sent upon application.

**WILSON BOHANNAN,**

(Manufacturer of Patent  
**BRASS**  
**Pad Locks,**  
FOR  
Railroad Switches,  
Freight Cars,  
AND THE HARDWARE TRADE  
All sizes, with Brass and Steel  
Keys, with and without chains.  
**PASSENGER CAR LOCKS,**  
Bronzed, Nickel-Plated and Japanned.  
BROOKLYN, N. Y.  
Catalogues and Samples sent upon application.



**Common Key Locks**  
AND  
**DIAL BANK LOCKS,**

made on the new principle, which greatly simplifies their construction and at the same time makes them absolutely proof against picking. \$300.00 is hereby offered to the person who will fairly pick the Key Lock, either the Mortise Lock or the Padlock; and \$500.00 for picking the two-tumbler Dial Bank Lock.

These Locks are made of bronze or malleable iron, and combine the three qualities of simplicity strength and absolute security.

Address  
**BALDWIN LOCK CO.**,  
TIoga, Penn.

**CROSSLEY'S**  
Patent Stave Jointer.



The most Simple, Durable and Perfect Jointer made. In four sizes, jointing from 16 to 46 inches in length. In use from Maine to California. Is used by the largest stave and barrel manufacturers in the world. Will pay for itself in 90 days in saving of time and timber over any Saw Jointer ever used. Send for circular to.

**H. A. CROSSLEY,**  
78 Columbus St., Cleveland, O.



Weather Vanes of every description, made from drawings. Also Mortars for Druggists' signs. Send for one of my Illustrated Price Lists.



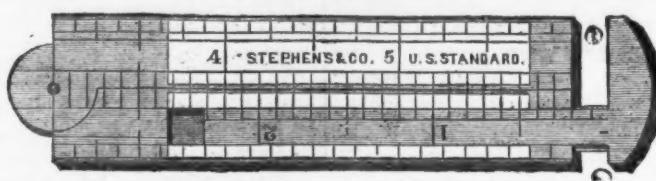
**V. W. BALDWIN, 213 Pearl Street, N. Y.**

Manufacturer of

**COPPER WEATHER VANES,**  
Emblematic Signs, Etc.

Established 1854.

**STEPHENS & CO.**,  
Manufacturers of U. S. STANDARD BOXWOOD and IVORY RULES.



Also Exclusive Manufacturers of L. C. Stephen's Patent Combination Rule. Rules graduated in foreign measure to order.



ESTABLISHED 1850.  
**WM. HASSALL,**  
Manufacturer of  
American and French  
**Wire Nails**

With Flat, Round, Oval, Depressed, Screw and  
Fancy Heads.

Molding and Finishing Nails, with or without heads. Brush Makers', Upholsterers' and Undertakers' Finishing Nails a specialty. Shoe Nails of Brass and Iron, Bright Iron Rivets, Brass and Iron Escutcheon Pins, with flat, round and fancy heads, all sizes on hand and to order.

OFFICE AND WORKS: Nos. 63 & 65 Elizabeth Street, New York.

**THE AMERICAN WIRE NAIL CO.,**  
Manufacturers of  
Molding, Trimming, Upholstering & Finishing Nails,  
Escutcheon Pins and Wire Nails  
Of all kinds and sizes, with Flat, Oval, Depressed, or Countersunk Heads, with or without points. Warranted Well Made and of Superior Quality.

OFFICE AND WORKS, Covington, Ky.

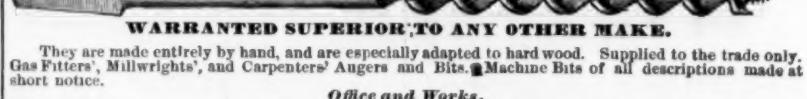
**THE CONNECTICUT VALLEY MFG. CO.,**  
CENTERBROOK, CONN., Manufacturers of  
Lewis' Patent Single Twist Spur Bits,



Send for our Illustrated price list and discounts.

TRADE  
MARK

**JOB T. PUGH'S**  
Celebrated AUGERS and BITS.



WARRANTED SUPERIOR TO ANY OTHER MAKE.

They are made entirely by hand, and are especially adapted to hard wood. Supplied to the trade only.

Gas Fitters', Millwrights', and Carpenters' Augers and Bits. Machine Bits of all descriptions made at short notice.

Office and Works, Rear of Nos. 3112, 3114, 3116, 3118 & 3120 Market Street, Philadelphia, Pa.

**RICHARD DUDGEON,**  
No. 24 Columbia Street, New York,  
MAKER AND PATENTEE OF

**Hydraulic Jacks and Punches,**  
ROLLER TUBE EXPANDERS  
And Direct-Acting Steam Hammers.

Communications by letter will receive prompt attention.

JACKS for Pressing on Car Wheels or CRANK PINS made to order

My Vanes are made of Copper, and gilded with 23 carat gold leaf. I have the largest stock of Vanes in the United States. Estimates furnished for ornamental work.

PATENTED

ST. LOUIS STAMPING CO.

GRANITE IRON WARE

MAY 30, 1876.

ST. LOUIS, MO.

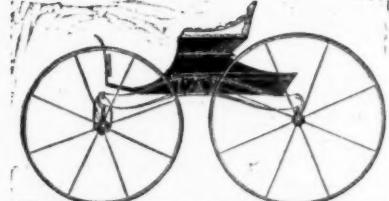
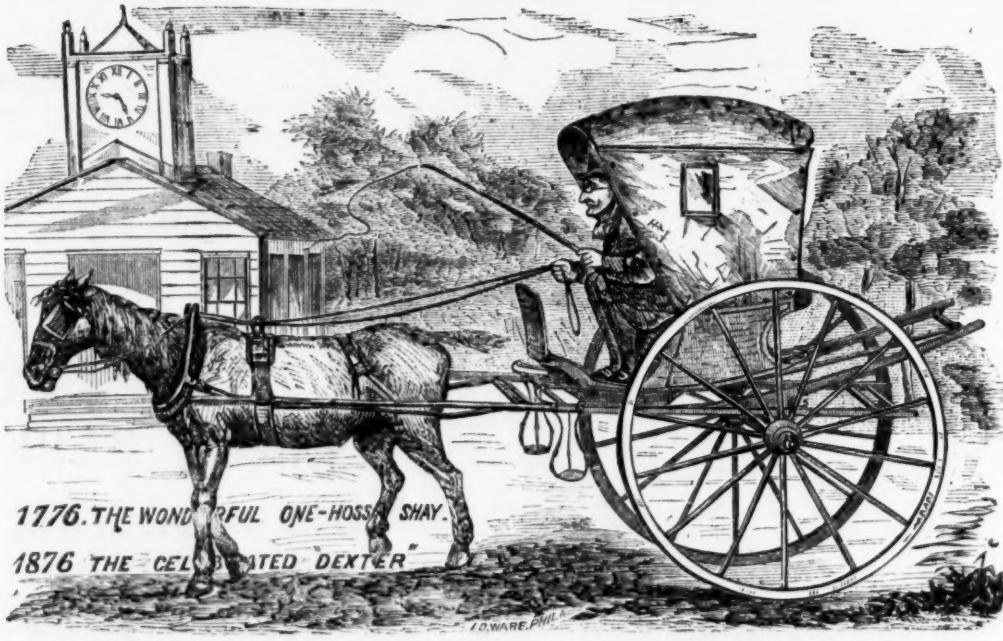
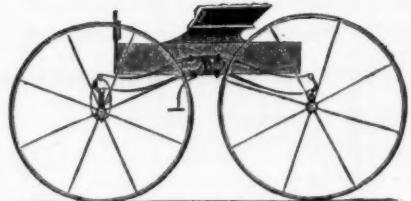
All Goods Marked  
FOR SALE

GRANITE IRON WARE IS THE ONLY SUITABLE HOUSEHOLD WARE MADE.

Represented in New York by the WIEBUSCH & HILGER HARDWARE CO., Nos. 84 and 86 Chambers Street.

Granite Iron Ware.  
EVERYWHERE

## DEXTER SPRING CO., Hulton, Pa.

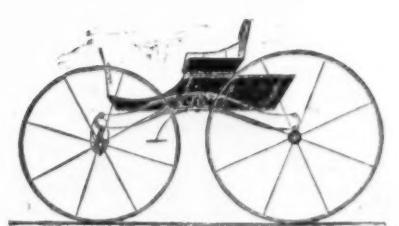
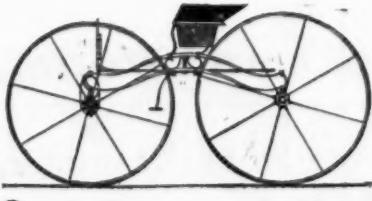


Manufacture the

Dexter  
Spring.

CELEBRATED

THE BEST IN USE.



## Steel.

**SULZBACHER, HYMAN, WOLFF & CO.,**  
 IMPORTERS OF  
**IRON AND STEEL.**

Sole Agents for the Sale of the Celebrated  
**Pr. HOMOGENEOUS DEC. CAST STEEL, GUN BAR-**  
**RELS, MOULDS AND ORDNANCE.**

Sole Agents for **COCKER BROTHERS, Limited.**  
 Successors to  
 SAM'L. COCKER & SON, (ESTABLISHED 1752.)

**SHEFFIELD, ENGLAND.**

Sole manufacturers of

**"EXTRA" Cast Steel,**  
 AND  
 CAST STEEL WIRE FOR ALL PURPOSES.

Sole makers of **COCKER'S "METEOR" WIRE PLATES.**  
 Railroad Supplies and General Merchants.

Office and Warehouse, 46 Cliff Street, New York

**F. W. MOSS,**

Successor to JOSHUA MOSS & GAMBLE BROS.

**FRANKLIN WORKS,**  
**WADSWELL BRIDGE WORKS,**  
**WALKLEY WORKS,** SHEFFIELD, ENGLAND.

**STEEL AND FILES.**

Principal Depots: 80 John St., N. Y., and 512 Commerce St., Phila.

**MOSS & GAMBLE SUPERIOR C. S. "FULL WEIGHT" FILES,**

Cast Steel Hammers and Sledges. Also, "M. & G." Anvils and Vises.

**WARRANTED CAST STEEL,** especially adapted for DIES and TURN-  
 PUNCHES and all kinds of MACHINISTS' TOOLS.

Celebrated Improved Mild Centre Cast Steel, for Taps, Reamers, and Milling Tools,

warranted not to crack in hardening Taps of any size.

Swede Spring Steel, especially adapted to Locomotive and Railway Car Springs.

English Spring and Plow Plate Steel.

**GENERAL MERCHANT.**

**Isaac Jenks & Sons,**

MINERVA AND BEAVER WORKS, WOLVERHAMPTON, ENGLAND.

MANUFACTURERS OF

"JENKS" SPRING STEEL, "MINERVA" SWEDES, AND "ANGLO" CAST SPRING STEEL

"JENKS" TIRE, TOE CORK, SLEIGH SHOE, BLISTER, AND PLOW STEEL;

ALSO,

"BEAVER" PLOW, TIRE, AXE, AND SHEET IRON.

ISAAC JENKS, Jr., Representative, 245 Pearl and 20 Cliff Streets, N. Y.

**FRANCIS HOBSON & SON,**  
 97 John Street, NEW YORK,

Sole Manufact'rs of **"CHOICE"** Extra Cast Steel.

Manufacturers of all Descriptions of Steel.

Manufacturers of Every Kind of Steel Wire.

Don Works, Sheffield, England.

CHAS. HUGILL, Agent.

**S. & C. WARDLOW,**  
 Sheffield, England,

Manufacturers of the Celebrated

Cast and Double Shear  
**STEEL.**

In Bars, Sheets and Coils, for fine Pen and Pocket Cutlery, Table Knives, Turning Tools, Dies, Files, Clock and other Springs, and Tools of every variety.

Warehouse, 95 John Street, New York.

WILLIAM BROWN, Representative.

Established 1810.

**J. & RILEY CARR,**  
 SHEFFIELD, ENGLAND.

Manufacturers of the "Celebrated"

**"DOG BRAND" FILES.**

Also of Superior

**STEEL**

For Drills, Cold Chisel, Tools, Taps, Dies, &c.

**COLD ROLLED STEEL** for Clock Springs, Corsets, &c.  
**SHEET CAST STEEL** for Springs, Saws, Welding and Stamping Cold, &c.  
 GERMAN, MACHINERY, ENGLISH AND SWEDES SPRING STEEL,  
 And all other descriptions for machinists and agricultural purposes.

Warehouse, 30 Gold Street, New York.



(Near John Street.) HENRY MOORE, Agent.

## Steel.

**SANDERSON BROS. STEEL COMPANY,**  
 GEDDES WORKS, SYRACUSE, N. Y.

Manufacturers of the Celebrated

**SANDERSON BROTHERS & CO.'S**

**CAST STEEL,**

Warranted most **SUPERIOR** and **UNSURPASSED** for  
**TOOLS** and **GRANITE ROCK DRILLS.**

EDWARD FRITH, Treasurer, 16 Cliff St., New York.

WILLIAM A. SWEET, General Manager, Syracuse, N. Y.

A full assortment of this universally approved OLD BRAND of English Steel

For Sale at

16 Cliff Street, NEW YORK.

**SWEET'S MANUFACTURING COMPANY**  
 SYRACUSE, N. Y.

Manufacturers of "SWEET'S" celebrated

**STEEL GOODS.**

Sweet's Excelsior Tire Steel.

Sweet's Oil Tempered Black Seat Springs.

BENT AND TWISTED  
 TRADE MARK.

COLD

SLEIGH SHOE STEEL. CALKING STEEL. STEEL CUTTER SHOES.  
 MACHINERY STEEL. KNIFE BACK STEEL. " HARROW TEETH.  
 SPRING STEEL. STEEL CROW BARS. " TOE CALKS.  
 AND ALL KINDS OF ROLLED AND HAMMERED STEEL.

W. A. SWEET, President. J. M. SCHERMERHORN, Jr., Treasurer. FRED. B. CHAPMAN, Secretary.

LABELLE STEEL WORKS.

**SMITH, SUTTON & CO.,**

MANUFACTURERS OF ALL KINDS OF

**STEEL.**

Also, Springs, Axles, Rake Teeth, &c.

OFFICE & WORKS, Ridge, Lighthill & Belmont Sts., & Ohio River, Allegheny.  
 Post Office Address, Pittsburgh, Pa.

**MIDVALE STEEL WORKS.**

Works and Office, NICETOWN, PHILADELPHIA, PA.

MANUFACTURERS OF

**CRUCIBLE AND OPEN HEARTH STEEL,**

Steel Locomotive Tires. Steel Axles of every description.  
 STEEL FORGINGS UP TO 8000 lbs. IN WEIGHT.

Solid Steel Castings, Hammer Dies, Frogs, Crossings, etc.  
 BEST TOOL, MACHINERY AND SPRING STEELS.

WM. SELLERS, Pres. CHAS. A. BRINLEY, Supt. MARRIOTT C. SMYTH, Sec. & Treas.

ALSO, MANUFACTURERS OF SUPERFINE FLOATED

**Standard Barvtes.**

Office, 214 Pearl Street, New York

**MILLER, METCALF & PARKIN,**
**Crescent Steel Works,**

PITTSBURGH, PA.

Manufacturers of all Descriptions of

**STEEL,**

EQUAL TO ANY IN THE MARKET.

Office, 239 Liberty Street, PITTSBURGH, PA.

**JONAS, MEYER & COLVER,**

CONTINENTAL STEEL WORKS, ATTERTCLIFFE,

Manufacturers of

**EXTRA BEST WARRANTED CAST STEEL,**

For all Descriptions of Fine Tools.

J. M. & C. Manufacture Tool Steel exclusively.

M. DIAMOND & CO., Principal Agents for the United States and Canada.

Office and Warehouse, No. 6 Ford Street, HARTFORD, CONN.

**D. G. GAUTIER & CO.,**

MANUFACTURERS OF

Hammered and Rolled STEEL of every description

JERSEY CITY, NEW JERSEY.

DUDLEY G. GAUTIER. JOSIAH H. GAUTIER.

## Steel.

**R. MUSHET'S**  
 Special Steel  
 FOR

LATHES, PLANERS, &c.

Turns out at least double work, by increased speed  
 and feed, and cuts harder metals than any other  
 Steel. Neither hardening nor tempering required.

Soe Makers

**SAMUEL OSBORN & CO.,**  
 Sheffield, England.

Represented by

**RANDALL & JONES,** 10 Oliver St., Boston.  
 BRANCH, CROOKES & CO., Vine Street, St. Louis, Mo.

**Gunpowder.**
**GUNPOWDER**
**DUPONT'S**

Sporting, Shipping, and Mining  
**POWDER.**

DUPONT'S GUNPOWDER MILLS,

ESTABLISHED IN 1801,  
 Have maintained their great reputation for 75  
 years. Manufacture the

Celebrated Eagle Ducking,  
 Eagle Rifle, & Diamond  
 Grain Powder.

THE MOST POPULAR POWDER IN USE,  
 Also, SPORTING, MINING, SHIPPING, AND BLAST-  
 ING POWDER.

of all kinds and descriptions.

For sale in all parts of the country. Represent-  
 ed by

**F. L. KNEELAND**

70 Wall Street, NEW YORK.

**GUN POWDER.**

**Laflin & Rand Powder Co.,**

No. 26 Murray Street, New York,  
 Manufacture and sell the following celebrated brands  
 of Sporting Powder known everywhere as

**ORANGE LIGHTNING,**  
**ORANGE DUCKING,**  
**ORANGE RIFLE,**

more popular than any Powder now in use.  
 Blasting Powder and Electrical Blasting  
 Apparatus.

Military Powder on hand and made to order.

SAFETY FUSE, FRICTIONAL & PLATINUM  
 FUSES.

Pamphlets showing sizes of grain sent free.

**WM. ESTERBROOK**

Wholesale Manufacturer of

**Coal Hods,**  
**FIRE SHOVELS, Etc.**

511 Cherry St., PHILADELPHIA.

**FISHER'S MOWING MACHINE**  
 KNIFE CRINDER,  
 SICKLE EDGE HAT KNIVES, HAT FORKS, SEC-  
 TIONS, &c., &c.

Sold by Hardware and Implement Dealers  
 everywhere. Illustrated Circular and  
 Quotations sent free.

HENRY FISHER, Cauton, Ohio.

**DAVIS' PATENT HYDRANT.**

Patented May 8th, 1872. Hydrant required without the necessity of dis-  
 sisting it, with a self-acting valve, so that water may be turned on and off  
 without stopping the water. Now in practical use  
 in Washington, D. C., and by the Water Department, D. C.

STATE RIGHTS FOR SALE.

JOHN T. DAVIS,

No. 312 Eleventh Street, S. E., Washington, D. C.,

Manufacturer of all kinds of

Plumbing, Steam and Gas Fitting Materials.

**HIGHEST MEDAL AWARDED.**


## Steel.

**THE EDGAR THOMSON STEEL CO.,  
LIMITED.**  
MANUFACTURERS OF

**STEEL RAILS. BLOOMS & INGOTS**

General Office and Works at Bessemer Station (Penn. R. R.), Allegheny County, Pa.

New York Office, 57 Broadway.

The members of the Edgar Thomson Steel Company, Limited, have had large experience in manufacturing Bessemer steel, and are now the largest manufacturers of Bessemer steel in the world, with all the late improvements, and are located in the best Bessemer metal district in the United States, and their managing officers are experienced in the manufacture of Bessemer Steel.

The Company warrants its rails equal in quality to any manufactured in the United States.

Rails of any weight or section furnished on short notice. Orders for trial lots solicited.

Branch Office and P. O. Address, No. 41 Fifth Ave., Pittsburgh, Pa.  
D. McCANDLESS, Chairman.

WM. P. SHINN,  
General Manager.

**G. SANDERSON & CO.,**

Manufacturers of all descriptions of

**STEEL.**

**SHEFFIELD, ENGLAND.**

Particular attention is paid to quality and temper for

Files, Saws, Table and Pocket Cutlery, Angers, Shovels, &c.

ALSO STEEL of superior quality for Turning Tools, Taps, Dies, Drills, &c.

Hot and Cold Rolled Sheets for Clock Springs, Corset Clasps, Pens, &c.

Makers of the Celebrated ROCK BORING DRILL STEEL.

Warehouse, 102 John Street, New York.

**JOHN NICHOLSON & SONS,**

Sheffield, England.

Manufacturers of SUPERIOR

**STEEL**  
Of all Descriptions.

**F. A. HOWARD,**

Sole Agent for the United States.

81 John Street, New York. 38 Kilby Street, Boston.

**CHROME STEEL COMPANY,**

MANUFACTURERS OF

**CHROME CAST STEEL,**

WARRANTED SUPERIOR TO ANY STEEL IN THE MARKET—EITHER ENGLISH OR AMERICAN—

FOR EVERY PURPOSE.

Principal Office & Works, Kent Ave. and Keppel St., Brooklyn, E. D. N. Y.

AGENCIES,

Kimball Bros. & Co., Chicago, Illa.  
Huntington, Hopkins & Co., San Francisco and  
Sacramento, Cal.  
M. M. Buck & Co., St. Louis, Mo.  
Cincinnati Branch, 123 Central Ave., George Klusey, Manager.

Potter & Hoffman, Philadelphia, Pa.  
Geo. Dunbar & Co., Boston, Mass.  
Wood & Leggett, Hamilton, Ont.

ALBANY & RENSSELAER IRON & STEEL CO.,

**TROY, N. Y.,**

Office in New York City, 56 BROADWAY.

MANUFACTURERS OF

**Bessemer Railway Steel,**

MERCHANT BARS, TIRE AND SHAFTING,

Railroad Iron, Pig Iron, Merchant and Ship Iron,

AGENCIES IN BOSTON AND PHILADELPHIA.

**JOHN WILSON'S CELEBRATED**

BUTCHERS' KNIVES,

BUTCHERS' STEELS,

AND

SHOE KNIVES.

THE TRADE MARK, IN ADDITION  
TO THE NAME,  
IS STAMPED UPON EVERY ARTICLE MANUFACTURED BY

**JOHN WILSON.**

BUYERS ARE SPECIALLY CAUTIONED AGAINST  
IMITATIONS OF THE MARK, AND THE  
SUBSTITUTION OF COUNTERFEITS  
BEARING THE NAME, "WILSON," ONLY.

GRANTED A.D. 1766, BY THE  
CORPORATION OF CUTLERS OF SHEFFIELD,  
AND PROTECTED BY ACT OF PARLIAMENT.

Works:—SYCAMORE STREET, SHEFFIELD. ESTABLISHED in the Year 1750.



**HERMANN BOKER & CO.,**

OFFICES AND WAREHOUSES:

NEW YORK, 101 and 103 Duane and 91 and 93 Thomas Streets.

REMSCHIED and SOLINGEN (Prussia). H. BOKER & Co.

SHEFFIELD (England), No. 3 Arundel Lane, Represented by Mr. ARTHUR LEE.

LIEGE (Belgium), Represented by Mr. LOUIS MULLER.

Manufacturers and Importers of Cutlery, Guns, Hardware and Railroad Material. Proprietors of TRENTON VISE AND TOOL WORKS, Trenton, N. J.—Vises, Pliers, Mattocks, Grab Hoes, Sledges, Hammers, Bridge Work, Turn Tables, etc.

Proprietors of the MANHATTAN CUTLERY CO., "O. K." Razors.

LAMSON & GOODNOW MFG. CO., Shelburne Falls, Mass.—Table Cutlery and Butcher Knives.

W. & S. Butcher's Files, Edge Tools and Razors, the largest stock in the United States.

Geo. Wostenholm & Son's Knives, Scissors and Razors, the largest stock in the U. S.

John Wilson's Butcher and Shoe Knives.

Peter Wright's and Armitage Anvils.

We always have on hand a full assortment of German and English Hardware, Cutlery, Guns, Gun Material, Chains, Heavy Goods.

Business Established in 1830.

**BLAKE  
BROS.**  
Hardware Co.,

MANUFACTURERS OF

Plain and Ornamental Butts, Thumb Latches,  
STORE DOOR HANDLES,  
Single or Double Handle, Reversible Mortise Latch,

Patented January 9, 1877.

Oilable Axle Pulleys,

Patented October 10, 1876.

KEY ESCUTCHEONS that keep the Key in the Lock,

Patented February 2, 1875.

CORK EXTRACTORS, NUT CRACKERS,

And a large line of

**BUILDERS' HARDWARE.**

OFFICE, 85 Orange Street, New Haven, Ct.

FACTORIES, Westville, Ct.

AGENCIES:

Geo. H. Gray & Danforth, 48 India St., Boston, Mass.

Wm. A. Dodge, 96 Chambers Street, New York.

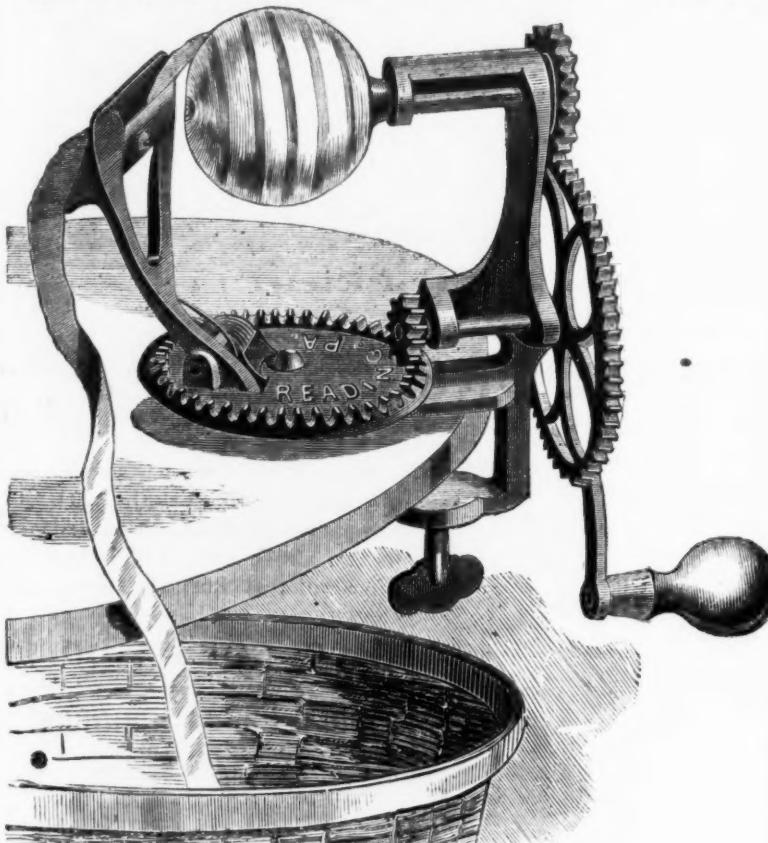
S. T. Latham & Co., 417 Commerce Street, Philadelphia, Pa.

Flocke & Co., 12 German Street, Baltimore, Md.

**READING BUTT WORKS.**

**RICK BROTHERS.**

"OLD RELIABLE" APPLE PARER.



(Every Parer guaranteed.)

Price, per single dozen ..... \$5.00.

Packed one dozen in a box.

New York Warehouses, 103 Chambers Street.

E. E. YATES & CO., Agents.

**Emery, Grindstones, &c.**

**Walter R. Wood,  
GRINDSTONES.**

SOLE AGENT OF THE

BEREA STONE CO., of Ohio,

NOVA SCOTIA and other brands.

283 & 285 Front Street, New York.

**WORTHINGTON & SONS,**

North Amherst, Ohio.

Manufacturers of

Lake Huron Amherst and Berea

**GRINDSTONES.**

**A. F. PIKE,**

East Haverhill, New Hampshire.

Manufacturer and Wholesale Dealer in

Seythe, Axe, Knife and Hacking

**STONES.**

**LETOILE,**

**UNION,**

**PREMIUM,**

**DIAMOND GRIT,**

**WHITE MOUNTAIN,**

**INDIAN POND** (red ends)

Stones gotten up or labeled in

any style desired. Price and

quality guaranteed.

Our Stone are of good keen

grit and will not blur.

**Steam Oil Stone Works.**

**F. E. DISHMAN,**

Successor to Wm. Galbraith & Co.

Manufacturer of and Dealer in the Best

Washita, Arkansas, Hindostan and Sand

**STONES,**

Of various sizes and patterns, suited to every variety

of Mechanical use. New Albany, Ind.

Send for price list.

**BOYD & CHASE,**

The largest manufacturer in the world of

**OIL STONE**

Of all description.

107th Street and Harlem River, NEW YORK.

Send for Price List.

**Coal.**

A. PARDEE, Hazleton, Pa. J. G. FELL, coal.

**A. PARDEE & CO.**

303 Walnut St.,

PHILADELPHIA.

No. 311 Broadway, New York.

MINERS AND SHIPPERS OF

**Lehigh Coals.**

The following superior and well known Lehigh Coals are mined by ourselves and firms connected with us, viz.

A. Pardee & Co. HAZLETON, CRANBERRY, SUGAR LOAF.

Pardee, Bro. & Co. LATTIMER.

Calvin Pardee & Co. HOLLYWOOD.

Pardee, Sons & Co. Mt. PLEASANT.

**ROBERT HARE POWEL**

& CO.

GENERAL OFFICES:

424 Walnut Street, Philadelphia.

75 Trinity Building, New York.

16 S. Water St., Providence, R. I.

22 Central St., Boston, Mass.

Sole Proprietors, Miners & Shippers

of the celebrated

**POWELTON**

**SEMI-BITUMINOUS**

**COALS.**

## WHEELING HINGE CO.,

Wheeling, West Va.,

Manufacturers of

Wrought Butts, Strap & T Hinges, Wrought Hooks, Hasps & Staples, Wrought Repair Links & Washers.

GRAHAM &amp; HAINES, Sole Agents, 113 Chambers &amp; 95 Reade Sts., N. Y.

QUACKENBUSH, TOWNSEND & CO.,  
Hardware, Cutlery, &c.

85 Chambers &amp; 67 Reade Sts., N. Y.

Depot for  
THOS. JOWITT & SONS,  
(Sheffield, England.)  
FILES and HORSE RASPS.  
Rough & Ready  
And  
CLIPPER SCYTHES,  
Warranted.



Patented March 4, 1873.

Patented March 4, 1873.

Patented March 4, 1873.

## CLARK &amp; CO.,

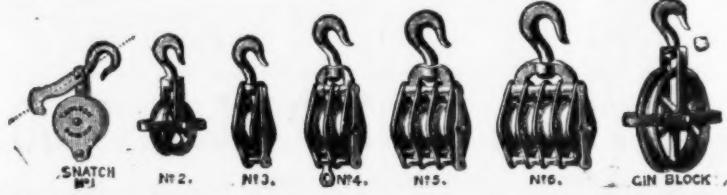
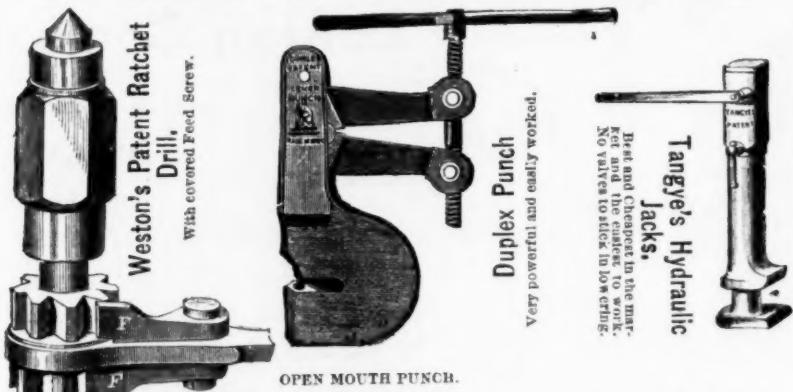
MANUFACTURERS OF

BUILDERS'  
HARDWARE.426 & 428 Niagara Streets,  
BUFFALO, N. Y.

J. CLARK WILSON &amp; CO., Agents,

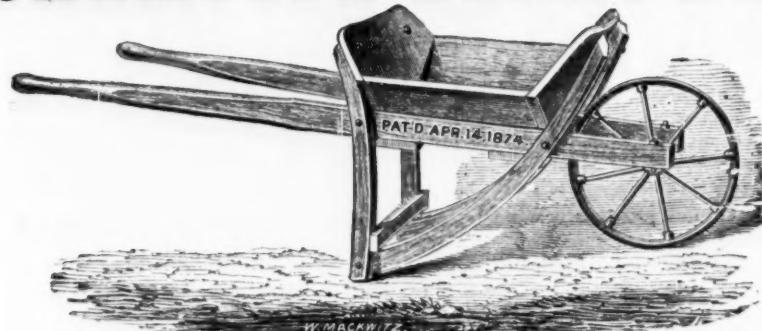
81 Beekman St., New York.

Send for Catalogue and Price List.

WROUGHT IRON BLOCKS  
FOR ROPE OR CHAIN.All sizes constantly on hand for Rope from  $\frac{1}{4}$  in. to  $2\frac{1}{2}$  in. diam., and for Chain 3-16 to  $\frac{1}{4}$  in. diam.

McCoy &amp; Co., 134 &amp; 136 Duane Street, New York.

## CHAMPION BARROWS.



## WITH WOOD OR IRON WHEELS.

A first-class article and a specialty, that will make a demand in any market and afford a good margin for dealers. We are prepared to furnish them in large quantities. Manufactured by

BRYAN MANUFACTURING CO., Bryan, O.

SEMPLE &amp; BIRGE MFG. CO., Sole Western Agents, ST. LOUIS, MO.

For Sale by THE NEW YORK PLOW CO., General Eastern Agents, 55 Beekman St., New York.



## PATENT COMBINATION WRENCH.

These Wrenches are made from the best of Wrought Iron, with Steel Head and Jaw, Case-hardened throughout, and not only combine all of the superior qualities of our cylinder or Gas Pipe Wrenches, but also all requisite Combinations of a regular Nut Wrench, thus making a Combination which has no equal.

For Circulars and Price List, address,

BEMIS &amp; CALL HARDWARE &amp; TOOL CO., Springfield, Mass.

## METALLIC SIEVES.



Protected by 14 patents.

MANN'S PATENT.

Best Sieve known, Cheap, Neat and Durable.

ADAMS &amp; WESTLAKE MFG. CO.,

CHICAGO, ILLS.



GRANT &amp; CO., Newark, N. J.

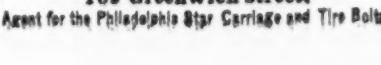
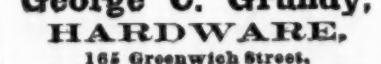
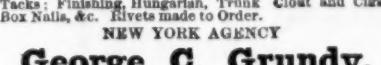
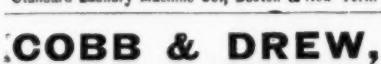
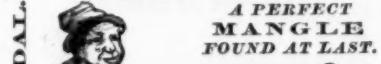
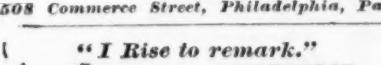
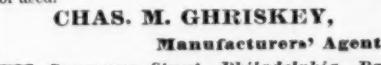
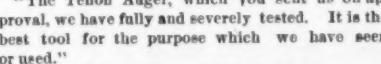
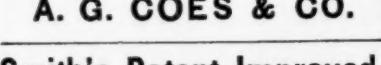
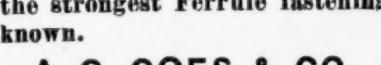
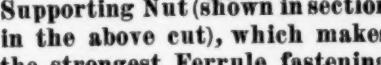
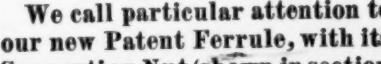
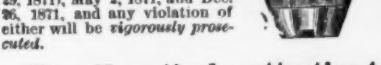
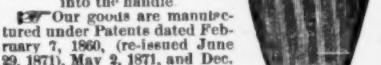
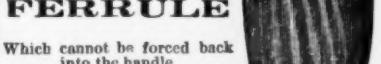
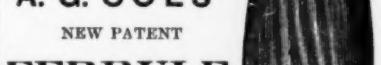
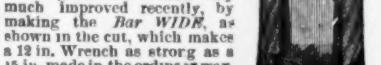
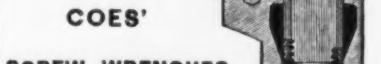
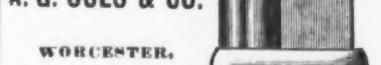
Cap Rifles &amp; Targets.



A. G. COES

PAT. DEC. 26, 1871.

Established in 1839.





## WHEELING HINGE CO., Wheeling, West Va.,

Manufacturers of

Wrought Butts, Strap & T Hinges, Wrought Hooks, Hasps & Staples, Wrought Repair Links & Washers.

GRAHAM &amp; HAINES, Sole Agents, 113 Chambers &amp; 95 Reade Sts., N. Y.

## QUACKENBUSH, TOWNSEND & CO., Hardware, Cutlery, &c.

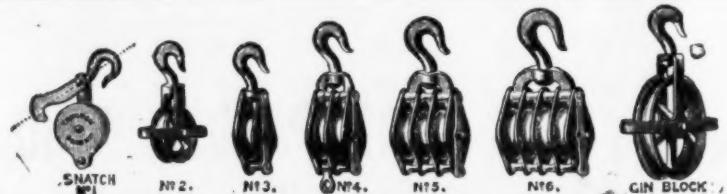
85 Chambers &amp; 67 Reade Sts., N. Y.

Depot for  
THOS. JOWITT & SONS,  
(Sheffield, England.)  
FILE & HORSE RASPS.  
HORSE & READY  
And  
CLIPPER SCYTHES,  
Warranted.



Patented March 4, 1874.

## CLARK & CO., MANUFACTURERS OF BUILDERS' HARDWARE.

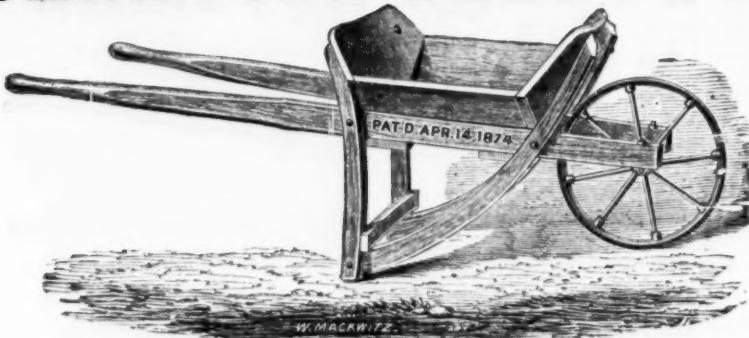
426 & 428 Niagara Streets,  
BUFFALO, N. Y.J. CLARK WILSON & CO., Agents,  
81 Beekman St., New York.  
Send for Catalogue and Price List.

## WROUGHT IRON BLOCKS FOR ROPE OR CHAIN.

All sizes constantly on hand for Rope from  $\frac{1}{4}$  in. to  $2\frac{1}{2}$  in. diam., and for Chain 3-16 to  $\frac{3}{4}$  in. diam.

McCoy &amp; CO., 134 &amp; 136 Duane Street, New York.

## CHAMPION BARROWS.



### WITH WOOD OR IRON WHEELS.

A first-class article and a specialty, that will make a demand in any market and afford a good margin for dealers. We are prepared to furnish them in large quantities. Manufactured by

BRYAN MANUFACTURING CO., Bryan, O.

SEMPLE &amp; BIRGE MFG. CO., Sole Western Agents, ST. LOUIS, MO.

For Sale by THE NEW YORK PLOW CO., General Eastern Agents, 55 Beekman St., New York.



### PATENT COMBINATION WRENCH.

These Wrenches are made from the best of Wrought Iron, with Steel Head and Jaw, Case-hardened throughout, and not only combine all of the superior qualities of our cylinder or Gas Pipe Wrenches, but also all requisite Combinations of a regular Nut Wrench, thus making a Combination which has no equal. For Circulars and Price List, address,

BEMIS &amp; CALL HARDWARE &amp; TOOL CO., Springfield, Mass.

## METALLIC SIEVES.



Protected by 14 patents.

MANN'S PATENT.  
Best Sieve known, Cheap, Neat and Durable.  
ADAMS & WESTLAKE MFG. CO.,  
CHICAGO, ILLS.



Established in 1839.



A. G. COES &amp; CO.

WORCESTER,

Mass.,

Manufacturers of

THE GENUINE

COES'

## SCREW WRENCHES.

Our goods have been very much improved recently, by making the Bar WRENCH, as shown in the cut, which makes a 12 in. Wrench as strong as a 15 in. made in the ordinary way, and by using

A. G. COES'

NEW PATENT

## FERRULE

Which cannot be forced back into the handle.

Our goods are manufactured under Patents dated February 7, 1860, (re-issued June 29, 1871), May 2, 1871, and Dec. 26, 1871, and any violation of either will be vigorously prosecuted.

We call particular attention to our new Patent Ferrule, with its Supporting Nut (shown in section in the above cut), which makes the strongest Ferrule fastening known.

A. G. COES &amp; CO.

## Smith's Patent Improved.



## THE BEST ADJUSTABLE HOLLOW AUGER MADE.

E. M. BIRDSELL & CO., Pen Yan, N. Y., write: The Tenon Auger, which you sent us on approval, we have fully and severely tested. It is the best tool for the purpose which we have seen or used."

CHAS. M. GHRISKEY,  
Manufacturers' Agent,  
508 Commerce Street, Philadelphia, Pa.



## COBB & DREW, Plymouth, Mass.

Manufacturers of Copper, Brass, and Iron Rivets; Common and Swedish Iron, Leathered, Carpet, Lace and Gimp Tacks; Finishing, Hungarian, Trunk Clout and Clasp Box Nails, &c. Rivets made to Order.

NEW YORK AGENCY

## George C. Grundy, HARDWARE,

165 Greenwich Street,  
Agent for the Philadelphia Star Carriage and Tire Bolts.

## Lloyd, Supplee & Walton, HARDWARE FACTORS.

MANUFACTURERS OF

### Bonney's Hollow

### AUGERS.

### Stearn's Hollow Augers

### and Saw Vises

### Bonney's Spoke Trimmers

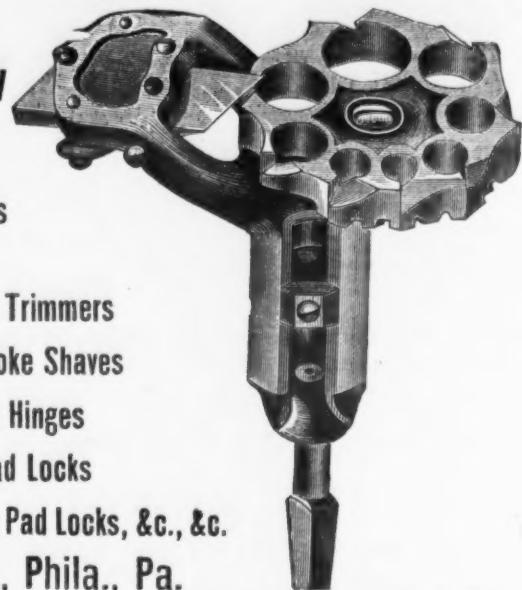
### Double Edge Spoke Shaves

### Adjustable Gate Hinges

### Scandinavian Pad Locks

### Flat Key Brass and Iron Pad Locks, &c., &c.

625 Market St., Phila., Pa.



## "FELTER'S PATENT LOCKS,"

MANUFACTURED BY

The American Lock Mfg. Co.,

Are the most SECURE and DURABLE ever made.

### SECURE

Because they have 40 Brass Tumblers, independent in their action, either one of which will prevent the Lock from being opened unless brought to proper position by the Key.

### DURABLE

Because we use no Springs to break or get out of place.

### THEY HAVE

### STERLING METAL KEYS

That will not corrode or wear, and are stronger than steel.



### Upright Rim Dead Locks,

### Horizontal Rim Night Latches,

### Horizontal Rim Tubular Night Latches,

### Mortise Night Latches, Plain Fronts,

### Mortise Night Latches, Ornamental Bronze

Fronts and Knobs,

Brass Chest, Box, Cupboard and

Drawer Locks,

### Solid Bronze Padlocks.

Illustrated Catalogue and

Price List sent on application.

All orders should be addressed

to

UNION NUT CO., General Agents, 99 Chambers St., N. Y.

## BRIGHAM, LITCHFIELD & Vining,

Manufacturers of all kinds of

### TACKS, Brads, Nails, &c.

All headed work assorted by our new

### PATENT ASSORTER,

which removes all dust and slivers and imperfect Tacks, so that the purchaser pays for nothing but

PERFECT GOODS. Every kind of Tack or Nail made to order from samples. We allow nothing but FIRST-CLASS WORK to go out of our factory.

Also Manufacturers and Proprietors of

### HENDRY'S PATENT CARRIAGE AXLE.

Patented June 29, 1876.

Patented June 13, 1876

### DESCRIPTION,

A. Section of hub complete, showing the chamber o.

B. Front hub.

C. Nut which screws on to box D, and confines box D and band B to the hub.

D. Box and back band in one piece.

E. Axle.

F. Wrench in place on back band.

G. Axle with back nut unscrewed from box, and both slipped from the collar, showing leather washer each side of the collar, and front band in place.

### Points of Excellence.

No oil can come in contact with wood of the hub.

No oil can work.

No dirt, gravel or water can work.

It holds the wheel in a superior manner.

It is made to order than a common axle.

It requires no wedging to hold the wheel.

It will run 500 to 1000 miles without greasing.

South Abington, Mass.

Warerooms, 97 Chambers and 81 Reade Streets, N. Y.

## V. G. HUNDLEY.

79 Reade Street, New York.



## North Carolina Handle Co.

Manufacturers of

SPOKES, AXE, PICK, SLEDGE, HAMMER, HATCHET and other HANDLES.

Full assortment always on hand.

## PHILADELPHIA.

(Corrected weekly by Lloyd, Supples &amp; Walton).

Terms, 30 days. For 60 or 90 days, interest added at 10 per cent. per annum.

## Anvils.

Peter Wright's, 9 lb. gold..... 11 @ 10 1/2  
 Wilkinson's ..... 10 @ 10 1/2  
 Farson's ..... 9 cents per lb—10 1/2  
 Apple Parers—Domestic ..... per doz \$ 6 50  
 Peach Parer ..... 10 50  
 Bay State Parer, Corer and Slicer ..... 12 50  
 Other makes ..... 7 50  
 Lots of 5 to 25 dozen special price.

## Augers and Auger Bits.

Benjamin Pierce ..... 10 50  
 Douglass & Ives' Bits ..... 11 @ 10 1/2  
 Connecticut Valley Auger Bits ..... 10 50  
 F. & J. B. ..... 10 50  
 Jennings' Bits ..... 10 50  
 Bates' Augers ..... 10 50  
 Douglass & Ives' Augers ..... 10 50  
 Waterbury Ship Auger ..... 10 50  
 Newell's Auger ..... 10 50  
 Stearns' Patent Hollow Auger ..... 10 50

## Bolts.

Man's (according to weight). Per doz. \$ 10 00 @ 9 00  
 Red Indian ..... 10 00 @ 9 00  
 Red Chieftain ..... 11 00 @ 10 10  
 Hunt's ..... 12 50 @ 11 50

## Auger and Auger Bits.

Benjamin Pierce ..... 10 50 @ 4 50  
 Douglass & Ives' Bits ..... 11 @ 10 1/2  
 Connecticut Valley Auger Bits ..... 10 50 @ 5 00  
 Jennings' Bits ..... 10 50  
 Bates' Augers ..... 10 50  
 Douglass & Ives' Augers ..... 10 50  
 Waterbury Ship Auger ..... 10 50  
 Newell's Auger ..... 10 50  
 Stearns' Patent Hollow Auger ..... 10 50

## Bolts.

Light or "Common" ..... 10 50 @ 10 1/2  
 All other Bolts ..... 10 50 @ 10 1/2

Bells.—Bever Bros. Mfg. Co. Light Hand Bells, doz 70  
 Hand, Common ..... 10 50 @ 7 50

Swiss Pattern Hand Bells ..... 10 50 @ 8 50  
 Connell's Doz. ..... 10 50 @ 8 50  
 G. & W. Kentucky Cow, new list, doz 40

Boring Machines.—Bates Mfg. Co., complete with augers ..... 25 @ 25 & 10 50  
 Douglas Mfg. Co., complete with augers ..... 40 @ 40  
 Common Boring Machines, no Augers ..... 15 @ 15

Augusta ..... 10 50  
 Bolts—Eastern Carriage Bolts ..... 10 50 @ 7 50 @ 5 00  
 Philadelphia ..... 10 50 @ 6 50 @ 5 00  
 Coleman ..... 10 50 @ 6 50 @ 5 00  
 Wrought Shutter, Stanley ..... 10 50 @ 5 00

Braces.—Barbers ..... 10 50 @ 4 50  
 Bartholomew's German Ball ..... 10 50 @ 4 50  
 Spondar ..... 10 50 @ 4 50  
 Universal ..... 10 50 @ 4 50

Burts—cast Part Joint, Narrow ..... 10 50 @ 12 50 @ 10 50  
 Broad ..... 10 50 @ 12 50 @ 10 50

Cast Loose Joint ..... 10 50 @ 12 50 @ 10 50

Acorn, Look, Pin ..... 10 50 @ 12 50 @ 10 50  
 " Acorn, " Jap'd. ..... 10 50 @ 12 50 @ 10 50  
 Players and Parliament ..... 10 50 @ 12 50 @ 10 50

Lull & Porter's (Phila.) Hinges ..... 10 50 @ 6 50 @ 5 00

Wrought Loose Hinges ..... 10 50 @ 6 50 @ 5 00

" Tarnished and Back Flaps ..... 10 50 @ 6 50 @ 5 00

" Narrow ..... 10 50 @ 6 50 @ 5 00

" Loose Joint ..... 10 50 @ 6 50 @ 5 00

Blind Butts ..... 10 50 @ 6 50 @ 5 00

Parker ..... 10 50 @ 7 50 @ 6 50 @ 5 00

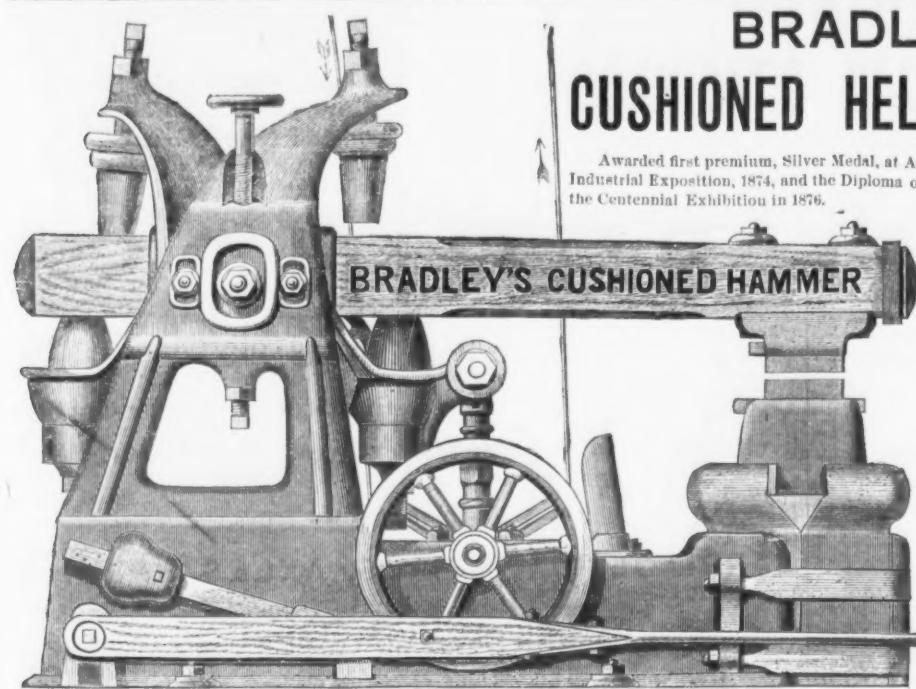
Buffalo Hardware Co. ..... 10 50 @ 6 50 @ 5 00

Clark ..... 10 50 @ 6 50 @ 5 00

Shoemaker ..... 10 50 @ 6 50 @ 5 00

Garrison ..... 10 50 @ 6 50 @ 5 00

Chains.—German Hanger and Coll. ..... 10 50 @ 5 00  
 Galvanized Pump ..... 10 50 @ 5 00  
 Best Proof Coal Chain ..... 10 50 @ 5 00  
 9 1/2 10 1/2 11 1/2 12 1/2 13 1/2 14 1/2 15 1/2 16 1/2 17 1/2 18 1/2 19 1/2 20 1/2 21 1/2 22 1/2 23 1/2 24 1/2 25 1/2 26 1/2 27 1/2 28 1/2 29 1/2 30 1/2 31 1/2 32 1/2 33 1/2 34 1/2 35 1/2 36 1/2 37 1/2 38 1/2 39 1/2 40 1/2 41 1/2 42 1/2 43 1/2 44 1/2 45 1/2 46 1/2 47 1/2 48 1/2 49 1/2 50 1/2 51 1/2 52 1/2 53 1/2 54 1/2 55 1/2 56 1/2 57 1/2 58 1/2 59 1/2 60 1/2 61 1/2 62 1/2 63 1/2 64 1/2 65 1/2 66 1/2 67 1/2 68 1/2 69 1/2 70 1/2 71 1/2 72 1/2 73 1/2 74 1/2 75 1/2 76 1/2 77 1/2 78 1/2 79 1/2 80 1/2 81 1/2 82 1/2 83 1/2 84 1/2 85 1/2 86 1/2 87 1/2 88 1/2 89 1/2 90 1/2 91 1/2 92 1/2 93 1/2 94 1/2 95 1/2 96 1/2 97 1/2 98 1/2 99 1/2 100 1/2 101 1/2 102 1/2 103 1/2 104 1/2 105 1/2 106 1/2 107 1/2 108 1/2 109 1/2 110 1/2 111 1/2 112 1/2 113 1/2 114 1/2 115 1/2 116 1/2 117 1/2 118 1/2 119 1/2 120 1/2 121 1/2 122 1/2 123 1/2 124 1/2 125 1/2 126 1/2 127 1/2 128 1/2 129 1/2 130 1/2 131 1/2 132 1/2 133 1/2 134 1/2 135 1/2 136 1/2 137 1/2 138 1/2 139 1/2 140 1/2 141 1/2 142 1/2 143 1/2 144 1/2 145 1/2 146 1/2 147 1/2 148 1/2 149 1/2 150 1/2 151 1/2 152 1/2 153 1/2 154 1/2 155 1/2 156 1/2 157 1/2 158 1/2 159 1/2 160 1/2 161 1/2 162 1/2 163 1/2 164 1/2 165 1/2 166 1/2 167 1/2 168 1/2 169 1/2 170 1/2 171 1/2 172 1/2 173 1/2 174 1/2 175 1/2 176 1/2 177 1/2 178 1/2 179 1/2 180 1/2 181 1/2 182 1/2 183 1/2 184 1/2 185 1/2 186 1/2 187 1/2 188 1/2 189 1/2 190 1/2 191 1/2 192 1/2 193 1/2 194 1/2 195 1/2 196 1/2 197 1/2 198 1/2 199 1/2 200 1/2 201 1/2 202 1/2 203 1/2 204 1/2 205 1/2 206 1/2 207 1/2 208 1/2 209 1/2 210 1/2 211 1/2 212 1/2 213 1/2 214 1/2 215 1/2 216 1/2 217 1/2 218 1/2 219 1/2 220 1/2 221 1/2 222 1/2 223 1/2 224 1/2 225 1/2 226 1/2 227 1/2 228 1/2 229 1/2 230 1/2 231 1/2 232 1/2 233 1/2 234 1/2 235 1/2 236 1/2 237 1/2 238 1/2 239 1/2 240 1/2 241 1/2 242 1/2 243 1/2 244 1/2 245 1/2 246 1/2 247 1/2 248 1/2 249 1/2 250 1/2 251 1/2 252 1/2 253 1/2 254 1/2 255 1/2 256 1/2 257 1/2 258 1/2 259 1/2 260 1/2 261 1/2 262 1/2 263 1/2 264 1/2 265 1/2 266 1/2 267 1/2 268 1/2 269 1/2 270 1/2 271 1/2 272 1/2 273 1/2 274 1/2 275 1/2 276 1/2 277 1/2 278 1/2 279 1/2 280 1/2 281 1/2 282 1/2 283 1/2 284 1/2 285 1/2 286 1/2 287 1/2 288 1/2 289 1/2 290 1/2 291 1/2 292 1/2 293 1/2 294 1/2 295 1/2 296 1/2 297 1/2 298 1/2 299 1/2 300 1/2 301 1/2 302 1/2 303 1/2 304 1/2 305 1/2 306 1/2 307 1/2 308 1/2 309 1/2 310 1/2 311 1/2 312 1/2 313 1/2 314 1/2 315 1/2 316 1/2 317 1/2 318 1/2 319 1/2 320 1/2 321 1/2 322 1/2 323 1/2 324 1/2 325 1/2 326 1/2 327 1/2 328 1/2 329 1/2 330 1/2 331 1/2 332 1/2 333 1/2 334 1/2 335 1/2 336 1/2 337 1/2 338 1/2 339 1/2 340 1/2 341 1/2 342 1/2 343 1/2 344 1/2 345 1/2 346 1/2 347 1/2 348 1/2 349 1/2 350 1/2 351 1/2 352 1/2 353 1/2 354 1/2 355 1/2 356 1/2 357 1/2 358 1/2 359 1/2 360 1/2 361 1/2 362 1/2 363 1/2 364 1/2 365 1/2 366 1/2 367 1/2 368 1/2 369 1/2 370 1/2 371 1/2 372 1/2 373 1/2 374 1/2 375 1/2 376 1/2 377 1/2 378 1/2 379 1/2 380 1/2 381 1/2 382 1/2 383 1/2 384 1/2 385 1/2 386 1/2 387 1/2 388 1/2 389 1/2 390 1/2 391 1/2 392 1/2 393 1/2 394 1/2 395 1/2 396 1/2 397 1/2 398 1/2 399 1/2 400 1/2 401 1/2 402 1/2 403 1/2 404 1/2 405 1/2 406 1/2 407 1/2 408 1/2 409 1/2 410 1/2 411 1/2 412 1/2 413 1/2 414 1/2 415 1/2 416 1/2 417 1/2 418 1/2 419 1/2 420 1/2 421 1/2 422 1/2 423 1/2 424 1/2 425 1/2 426 1/2 427 1/2 428 1/2 429 1/2 430 1/2 431 1/2 432 1/2 433 1/2 434 1/2 435 1/2 436 1/2 437 1/2 438 1/2 439 1/2 440 1/2 441 1/2 442 1/2 443 1/2 444 1/2 445 1/2 446 1/2 447 1/2 448 1/2 449 1/2 450 1/2 451 1/2 452 1/2 453 1/2 454 1/2 455 1/2 456 1/2 457 1/2 458 1/2 459 1/2 460 1/2 461 1/2 462 1/2 463 1/2 464 1/2 465 1/2 466 1/2 467 1/2 468 1/2 469 1/2 470 1/2 471 1/2 472 1/2 473 1/2 474 1/2 475 1/2 476 1/2 477 1/2 478 1/2 479 1/2 480 1/2 481 1/2 482 1/2 483 1/2 484 1/2 485 1/2 486 1/2 487 1/2 488 1/2 489 1/2 490 1/2 491 1/2 492 1/2 493 1/2 494 1/2 495 1/2 496 1/2 497 1/2 498 1/2 499 1/2 500 1/2 501 1/2 502 1/2 503 1/2 504 1/2 505 1/2 506 1/2 507 1/2 508 1/2 509 1/2 510 1/2 511 1/2 512 1/2 513 1/2 514 1/2 515 1/2 516 1/2 517 1/2 518 1/2 519 1/2 520 1/2 521 1/2 522 1/2 523 1/2 524 1/2 525 1/2 526 1/2 527 1/2 528 1/2 529 1/2 530 1/2 531 1/2 532 1/2 533 1/2 534 1/2 535 1/2 536 1/2 537 1/2 538 1/2 539 1/2 540 1/2 541 1/2 542 1/2 543 1/2 544 1/2 545 1/2 546 1/2 547 1/2 548 1/2 549 1/2 550 1/2 551 1/2 552 1/2 553 1/2 554 1/2 555 1/2 556 1/2 557 1/2 558 1/2 559 1/2 560 1/2 561 1/2 562 1/2 563 1/2 564 1/2 565 1/2 566 1/2 567 1/2 568 1/2 569 1/2 570 1/2 571 1/2 572 1/2 573 1/2 574 1/2 575 1/2 576 1/2 577 1/2 578 1/2 579 1/2 580 1/2 581 1/2 582 1/2 583 1/2 584 1/2 585 1/2 586 1/2 587 1/2 588 1/2 589 1/2 590 1/2 591 1/2 592 1/2 593 1/2 594 1/2 595 1/2 596 1/2 597 1/2 598 1/2 599 1/2 500 1/2 501 1/2 502 1/2 503 1/2 504 1/2 505 1/2 506 1/2 507 1/2 508 1/2 509 1/2 510 1/2 511 1/2 512 1/2 513 1/2 514 1/2 515 1/2 516 1/2 517 1/2 518 1/2 519 1/2 520 1/2 521 1/2 522 1/2 523 1/2 524 1/2 525 1/2 526 1/2 527 1/2 528 1/2 529 1/2 530 1/2 531 1/2 532 1/2 533 1/2 534 1/2 535 1/2 536 1/2 537 1/2 538 1/2 539 1/2 540 1/2 541 1/2 542 1/2 543 1/2 544 1/2 545 1/2 546 1/2 547 1/2 548 1/2 549 1/2 550 1/2 551 1/2 552 1/2 553 1/2 554 1/2 555 1/2 556 1/2 557 1/2 558 1/2 559 1/2 560 1/2 561 1/2 562 1/2 563 1/2 564 1



## BRADLEY'S CUSHIONED HELVE HAMMER.

Awarded first premium, Silver Medal, at American Institute Fair, 1873, Cincinnati Industrial Exposition, 1874, and the Diploma of Honor and Grand Medal of Merit at the Centennial Exhibition in 1876.

Being the highest award given any goods of their class in America or Europe.

It has More Good Points, Less Complication, More Adaptability, Larger Capacity, Does More & Better Work, Takes Less Power, Costs Less for Repairs, than any Hammer in the World.

Guaranteed as Represented.

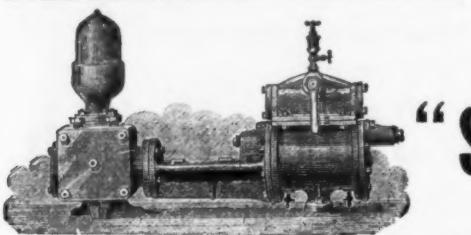
Bradley Mfg. Co.  
SYRACUSE, N. Y.  
Established 1752.  
Western Office, 22 S. Canal  
St., Chicago, Ill.  
A. B. BARNES, Manager.

## HOLROYD & CO.,

Waterford, N. Y.



### A. S. CAMERON'S PATENT



## "SPECIAL" STEAM PUMP

Is the Standard of Excellence at Home and Abroad.

For reduced price lists address A. S. CAMERON, East 23d Street, New York.

## LANE & BODLEY CO., HYDRAULIC ELEVATORS

For Stores, Warehouses, Residences and Hotels.

These elevators have advantages over special steam service, in first cost of construction, running expense, convenience, cleanliness and saving of insurance.

We have a large number in operation and they have been fully tested. Satisfactory results guaranteed.

LANE & BODLEY CO.,  
John and Water Streets, Cincinnati, O.

## LOVEGROVE & CO.,

125 North 4th St., Philadelphia, Pa.,

MANUFACTURERS OF

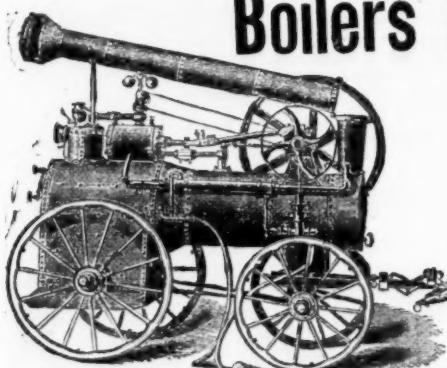
## Boilers and Engines.

### Boilers & Engines

of all styles and sizes, on hand and made to order.

Send for Price List.

Premium awarded by U. S. Centennial Commission.



## Morse Twist Drill and Machine Co.,

NEW BEDFORD, MASS., Sole Manufacturers of

Morse Patent Straight-Lip Increase Twist Drill, Beach's Patent Self-Centering Chuck, Solid and Shell Reamers.

### BIT STOCK DRILLS,

Drills for Coes, Worcester, Hunter and other Hand Drill Presses, Beach's Patent Self-Centering Chucks, Center and Adjustable Drill Chucks, Solid and Shell Reamers, Drill Grinding Machines, Taper Reamers, Milling Cutters and Special tools to order.

All Tools exact to Whitworth Standard Gauges.

GEO. R. STETSON, Supt.



EDWARD S. TABER, Treas.

## PUREST BLACK LEAD, Lump and Ground.

McILVAINE BROS.,

15th and Hamilton Streets, PHILADELPHIA.

## THE RIDER COMPRESSION PUMPING ENGINE.

NO BOILER,  
NO STEAM,  
NO DANGER.

Uses air as a Motive Power.

VALVELESS, NOISELESS,

Requires no Skilled Engineer.

Costs only from FIVE to TEN CENTS per day for fuel.

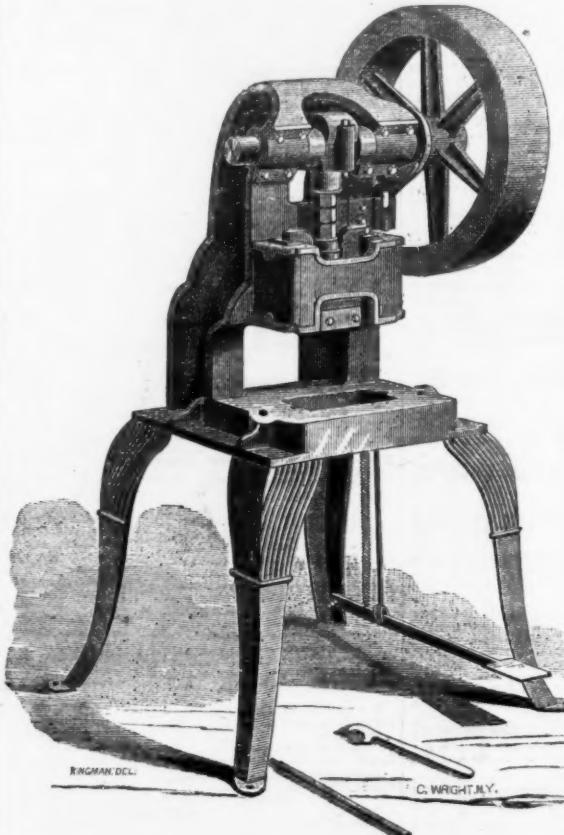
Particularly desirable for supplying  
RAILROAD TANKS, RESIDENCES, HOTELS, PUBLIC BUILDINGS, FRENCH FLATS, NURSERIES, FLORISTS, FOUNTAINS, IRRIGATING LANDS, &c., &c.

Send for descriptive Circular. Address

**RIDER, WOOSTER & CO., Makers, Walden, N. Y.**

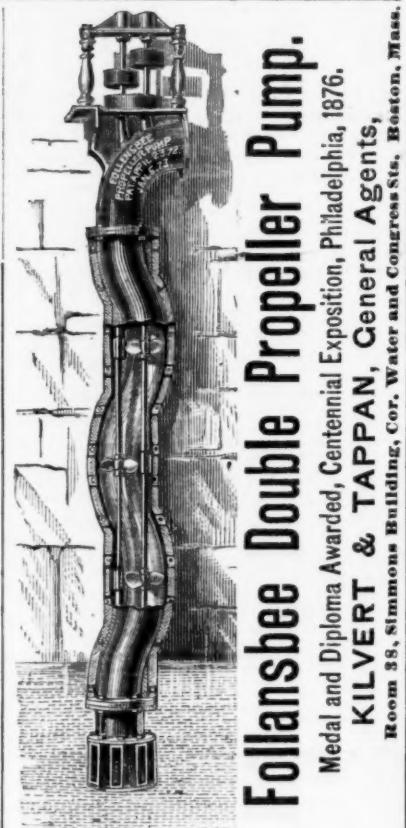
GENERAL AGENCIES, where these Engines may be seen in operation daily.

BOSTON.—Geo. Dunbar & Co., 109 Milk Street.  
NEW YORK.—Cammeyer & Sayer, 93 Liberty Street.  
PHILADELPHIA.—Kelly & Ludwig, 720 & 722 Filbert Street.  
CINCINNATI, O.—Cope & Maxwell Mfg. Co., 131 West 2nd Street.  
INDIANAPOLIS, IND.—Kerrick & Winegardner, 73 & 75 W. Maryland Street.  
COLDWATER, MICH.—C. M. Van Every & Co., 171 & 173 Lake Street.  
CHICAGO, ILL.—T. S. & A. J. Kirkwood, 103 N. 3rd Street.  
ST. LOUIS, MO.—M. M. Buck & Co., 103 N. 3rd Street.  
SAN FRANCISCO, CAL.—Huntington, Hopkins & Co., June. Bush & Market Sts.  
SACRAMENTO, CAL.—Huntington, Hopkins & Co., 52 to 58 K Street.



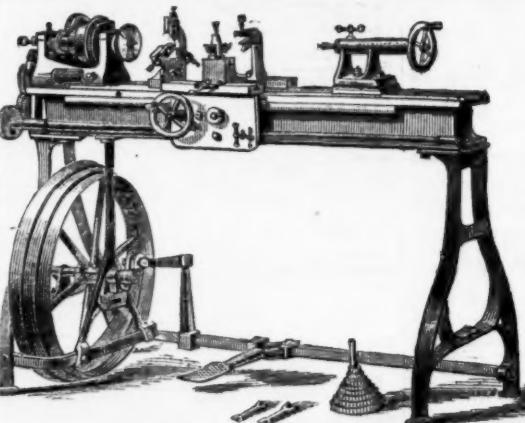
## BLISS & WILLIAMS, Manufacturers of all Kinds of PRESSES, DIES, & SPECIAL MACHINES,

FOR WORKING SHEET METALS, &c.  
167 to 173 Plymouth Street, Cor. of Jay, Brooklyn, N. Y.



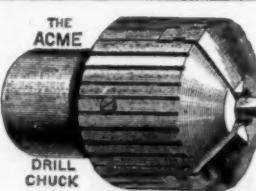
## Follansbee Double Propeller Pump.

Medal and Diploma Awarded, Centennial Exposition, Philadelphia, 1876.  
Room 55, Simmons Building, Cor. Water and Congress Sts., Boston, Mass.



Israel H. Johnson, Jr., & Co.,  
Tool & Machine Works  
Manufacturers of  
LATHES

And Their Attachments, of every variety, for Machinists, Brass Finishers, Wood Turners, Jobbers, &c., &c., to run by foot or steam power.  
Crank Shapers, Buffing Machines, Screw Machines, Turret Heads, Drawing & Lever Heads, Metal Presses, Screw and Electric Punches, Screw Clamps, Lathe Carriers, Reamers, Taps, Dies, &c.; also Boxes, Circular Saws, Shaving Couplings, Handing Pulleys, &c.  
Designing and Building of New and Special Tools and Machinery. Illustrated Catalogue and Price List free on application.  
No. 440 North Twelfth St., above Noble, Philadelphia, Pa.



This Chuck is new, perfect and durable. Price, \$4.25. Holds from 0 to  $\frac{1}{2}$  inch. Samples sent free by mail on receipt of price.

Address

A. F. CUSHMAN, Hartford, Conn.  
Manufacturer of all kinds and sizes of  
Lathe and Drill Chucks.

Orders from the trade solicited. Send for catalogue.



THE  
Green River  
TIRE UPSETTER.  
PRICE, \$20.00.  
Will upset, stretch and weld equally well on the lightest Steel Tire and on Wagon Tire 3 inches thick.

Frasse & Co.,  
AGENTS,

69 Chatham St., New York.  
Importers of and Dealers in

Fine Tools,  
Files, Steel Wire, &c.

## EUREKA SAFETY POWER!

Practically impossible to explode. Tested to 300 lbs pressure per square inch. Will cut through wood and metal brackets. Corns per hour. Price \$250. Also Stationary Engines and Motors and Spark Arresters. Portable for plantation use. Send for circular. Discount to the trade.

B. W. PAYNE & SONS,  
Corning, N. Y.



## THE JUDSON GOVERNOR.

It is a common method to advertise Governors *without cost*, un-  
less satisfied with the quality, and then charge *High Prices* for  
doing what any good Governor  
will do. Various Governors in-  
ferior to the "Judson" are sold  
this way, operating well enough  
for three months to lure collection  
of the pay, but becoming use-  
less after a year's wear—their  
construction is faulty. The "Judson" Governor is guaranteed to  
be not only the best Regulator of  
Steam Engines, but also the most  
durable Governor made. Parties in  
buying other Governors should  
stipulate that their durability be  
guaranteed, and should also take  
care that they do not for much in-  
terior Governors, pay half the price  
of the "Judson" shown in the accom-  
panying list. We guarantee the  
Judson Governor will do all any  
other Governor can do, and in Accu-  
racy and Durability—the main es-  
sentials—we guarantee it shall do  
more.

### Reduced Price List,

FEBRUARY 1, 1877.

Size, Inch.	Plain.	Brigh- t P. Lashed	Extra for Speed Valve.	Stop.
36	\$16.00	\$18.00	\$1.90	..
54	18.00	20.00	1.90	..
1	22.00	23.00	2.00	\$5.00
134	23.00	26.00	6.00	..
136	26.00	30.00	2.50	8.00
138	31.00	32.00	1.00	8.00
234	39.00	41.00	3.25	12.00
236	49.00	45.00	3.50	14.00
238	45.00	51.00	3.75	16.00
3	50.00	57.00	4.25	19.00
334	59.00	67.00	4.50	23.00
4	69.00	78.00	5.50	28.00
436	80.00	90.00	5.50	34.00
5	90.00	101.00	6.00	40.00
536	105.00	117.00	6.50	46.00
6	120.00	130.00	7.00	52.00
7	149.00	156.00	8.00	63.00
8	175.00	192.00	9.00	79.00
9	198.00	218.00	10.00	..
10	210.00	240.00	12.00	..

No Charge for Boxing & Cartage.

JUNIUS JUDSON & SON, Rochester, N. Y.

## The Albany Steam Trap.

This Trap automatically drains the water of condensation from *Heating Coils*, and returns the same to the Boiler whether the Coils are *above* or *below* the water level in Boiler, thus doing away with pumps and other mechanical devices for such purposes. Apply to

Albany Steam Trap Company,  
Albany, N. Y.

## The Pratt & Whitney Co., Hartford, Conn.,

Have constantly on hand and making

## Drop Hammers

Of recently improved construction. Pony Trip Hammers, Blacksmiths' Sheaves, Broaching and Stamping Presses, Iron Shop Cranes, Machinists' Tools, Gun and Sewing Machine Machinery. Make to order Gray and Charcoal Iron Castings of all styles and sizes not exceeding 15 tons weight, making patterns if desired. Furnish Clamp Pulleys of light patterns, cut gears in a superior manner, &c., &c.

Robt. Wetherill & Co  
CHESTER, PA.

Corliss Engine  
BUILDERS.

Shafting & Gearing.

Boiler Makers.

## R. S. NEWBOLD & SON, Eagle Works.

Norristown, Pa.

IMPROVED ROTARY SHEARS,  
Rolling Mill, Blast Furnace, Flour  
Mill, Mining and Water Works  
Machinery, Air Compressors,  
Ore Washers and Brick  
Machines.

REFERENCES:

Rotary Shears for Plates & Circles.  
A. Wood & Co., Conshohocken, Pa.  
E. & W. Swartwout, New York.  
Lewis Dalzell & Co., Pittsburgh, Pa.  
H. A. Beale & Co., Parkersburg, Pa.  
Rolling Mill & Blast Furnace Plants & Engines.  
Merion Furnaces, Conshohocken, Pa.  
Zurora Furnace, Wrightsville, Pa.  
Clove Spring Iron Works, New York.  
Norristown Water Co., Norristown.  
Oliver & Son, New Haven Sheet Mill.  
Portsmouth Iron Co.'s Plate Mill.  
Parkersburg Flue Mill.  
Morris, Tasker & Co., Engines.

Durand & Marais' French Pat. Brick Machine.  
For Brick Yards and Fire Brick Works, makes 10,000 superior bricks per day with two horse-power. In use at Brooklyn brick yards, Lynchburg, Va.; F. W. Kicknisch, Wauau, Wis.; Cheltenham Fire Brick Works, St. Louis, Mo. Can hack bricks 12 high at once. The best, simplest and cheapest machine made.

## THORNE, DeHAVEN & CO., Drilling Machines, 21st Street, above Market, Philadelphia.

PORTABLE DRILLS. Driven by power in any direction.  
RADIAL DRILLS. Self-feed—Large Adjustable Box Table.  
VERTICAL DRILLS. Self-feeding.  
MULTIPLE DRILLS. 2 to 20 Spindles.  
HORIZONTAL BORING AND DRILLING MACHINES.  
HAND DRILLS. CAR BOX DRILLS.  
SPECIAL DRILLS. For Special Work.

## H. H. HARVEY'S HAMMER AND TOOL WORKS, Augusta, Me.

SPECIALTIES—Stone Cutters' Hammers and Tools, Quarrymen's Drills, Wedges and Half Rounds, &c., &c. Miners' Hammers and Tools, Blacksmiths' Hammers and Tools, Patent Hammers for picking burr stone. Also the common Mill Picks and Wood wedges. Steel or Iron, H. R. Solid eye Picks, with one lb. of best Cast Steel inserted in each pick. The above goods are warranted inferior to none, both in quality and style of finish. All hammers are made of the best steel, and are made from the best cast steel. No charge is made for freight or carting at Augusta; shipping facilities are excellent. Hammer made to order to pattern and size required. Capacity of works, one ton of hammers per day. A full line of the above goods constantly in stock. Catalogue on application.

## BLAKE'S PATENT STONE & ORE BREAKER.

New Pattern with Important Improvements & Abundant Strength

For reducing to fragments all kinds of hard and brittle substances, such as  
IRON, COPPER, ZINC, SILVER, GOLD, and other ORES.  
Also for crushing Quartz, Flint, Emery, Corundum, Feldspar, Coal,  
Barites, Manganese, Phosphate Rock, Plaster, Soapstone, &c.  
For Illustrations, Circles, and particulars, address,

BLAKE CRUSHER CO., New Haven, Conn.

## Reduced Price List,

FEBRUARY 1, 1877.

Size, Inch.	Plain.	Brigh- t P. Lashed	Extra for Speed Valve.	Stop.
36	\$16.00	\$18.00	\$1.90	..
54	18.00	20.00	1.90	..
1	22.00	23.00	2.00	\$5.00
134	23.00	26.00	6.00	..
136	26.00	30.00	2.50	8.00
138	31.00	32.00	1.00	8.00
234	39.00	41.00	3.25	12.00
236	49.00	45.00	3.50	14.00
238	45.00	51.00	3.75	16.00
3	50.00	57.00	4.25	19.00
334	59.00	67.00	4.50	23.00
4	69.00	78.00	5.50	28.00
436	80.00	90.00	5.50	34.00
5	90.00	101.00	6.00	40.00
536	105.00	117.00	6.50	46.00
6	120.00	130.00	7.00	52.00
7	149.00	156.00	8.00	63.00
8	175.00	192.00	9.00	79.00
9	198.00	218.00	10.00	..
10	210.00	240.00	12.00	..

No Charge for Boxing & Cartage.

JUNIUS JUDSON & SON, Rochester, N. Y.

## KNOWLES'

## THE STANDARD.

Knowles Steam Pump  
Works,

92 & 94 Liberty St.,  
NEW YORK.

## The C. O. D. Engine COSTS LESS

And is equal to any Engine in the market.  
ALL WORKING PARTS WELL FINISHED.

No. 1, Cylinder 4x6..... \$125.00  
No. 2, " Ext. .... 150.00

MANUFACTURED BY

J. AUSTIN & CO.,

115 Liberty St., New York.

Also, Proprietors and Manufacturers of  
Wheatcroft's Self-Adjusting Pipe Wrench,  
AND  
SCRIPTURE'S FUNNEL TOP OILERS.

## Keystone Pressure Blowers.

Maximum Blast and Minimum Power.  
All sizes for

Forge, Foundries, Rolling Mills, &c.

## KEYSTONE EXHAUST BLOWERS.

Made on same principle,

For Ventilating Mines, Buildings, etc., Removing Dust, Shavings, etc.; Drying Coal, Charcoal, etc. Every Blower guaranteed. Send for circular, or call and see them in operation.

KEYSTONE PORTABLE FORGE CO.,

218 Carter Street, Philadelphia.

Also, sole manufacturers of the celebrated KEYSTONE PORTA-

BLE FORGES, for all classes of work, from the lightest to the heaviest.

W. MERRIMAN,  
Patent Power

## Punching Presses.

Patentee and Sole Manufacturer.

I warrant every part of this Machine to stand the shock  
of the wheel running at 125 revolutions.

West Meriden, Conn.

Machinery Hall, Philadelphia, Section B 4, Columns 28 and 29.

SILVER & DEMING MFG. CO.,

SALEM, OHIO, Manufacturers of

Improved TOOLS for the Use of Carriage and  
Wagon Makers and Blacksmiths.

Hub Boxing Machines, Hollow Augers, Spoke Tenoning Machines, Blacksmith Drills, Adjustable Clamps, Water Tayers Irons.

Send for Price List.

Star Hollow Auger.

## HAMMER & CO.,

Branford, Conn.,

Manufacturers of the following Patented Articles of

## MALLEABLE IRON:

Hammer's Adjustable Clamps.

Hammer's Malleable Iron Oilers.

Hammer's Mall. Iron Hand Lamps.

Hammer's M. I. Hanging Lamps.

For Sale by all the principal Hardware Dealers.

Malleable Iron Castings

Of superior Quality and Hardware Specialties in  
Malleable Iron made to order.

## SNYDER'S LITTLE GIANT STEAM ENGINE

The Best  
SMALL  
POWER ENGINES  
IN THE COUNTRY.

Manufactured by

WARD B. SNYDER.

9-4 Fulton St.,  
NEW YORK.

One-Horse Power, with tubular  
boiler complete, only \$150.

Two-Horse Power..... 200.

## Machinery, &amp;c.

THE

## Shapley Engine

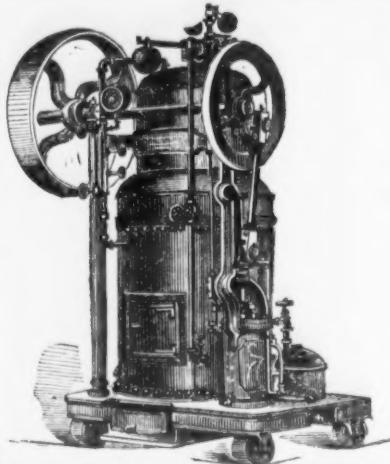
Patented Feb. 10, 1874.

COMPACT,  
PRACTICAL,  
DURABLE,  
ECONOMICAL.  
\$200.00.Cheaper than any Engine offered of  
the same capacity.

MANUFACTURED BY

SHAPLEY & WELLS  
Binghamton Iron Works,

Binghamton, N. Y.

Manufacturers of Steam Engines, Boilers, Water Wheels, Circular Saw Mills and  
Mill Work generally.

## BUSH HILL IRON WORKS,

Corner 16th &amp; Buttonwood Streets

PHILADELPHIA.

## JAMES MOORE,

(Successor to MATTHEWS &amp; MOORE,)

Engineer, Machinist, Founder and Boilermaker.

CASTINGS of every description.

ROLLING MILL AND FURNACE EQUIPMENTS COMPLETE

Rolls Turned for Rails, Beams, Angles, and all shapes for Iron, Steel, or  
Composition Metals.Sugar Mill, Saw Mill and Cist Mill Machinery,  
AND MILLWRIGHTING IN GENERAL.BOILERS—FLUE, TUBULAR AND CYLINDER, and all kinds of  
TANK AND PLATE IRON WORK.

## Machinery, &amp;c.

Established 1848.

## WM. SELLERS &amp; CO.,

600 Hamilton Street, PHILADELPHIA,

## Engineers, Iron Founders and Machinists.

## RAILWAY SHOP EQUIPMENTS.

Our Steam Hammers, Lathes, Planers, Drills and Bolt Cutters  
Are of Improved and Patented Construction.Railway Turning and Transfer Tables,  
SHAFTING & MILL GEARING, a specialty.

## Pivot Bridges.

GIFFARD'S INJECTOR--IMPROVED, SELF-ADJUSTING.



Issues Policies of Insurance after a careful Inspection of the Boilers

COVERING ALL LOSS OR DAMAGE TO

## Boilers, Buildings and Machinery,

ARISING FROM

## STEAM BOILER EXPLOSIONS.

The Business of the Company includes all kinds of STEAM BOILERS.

Full information concerning the plan of the Company's operations can be obtained at the

COMPANY'S OFFICE, HARTFORD, CONN.,

or at any Agency.

J. M. ALLEN, Pres. W. B. FRANKLIN, Vice-Pres. J. B. PIERCE, Sec.

## Board of Directors:

J. M. ALLEN, President.  
LUCILLE S. ALLEN, Pres't Aetna Fire Ins. Co.  
FRANK W. CHAPIN, Ass't Pres't, Cheney brothers  
Silk Manufacturing Co.  
CHARLES M. BEACH, of Beach & Co.  
DANIEL PHILLIPS, of Adams Express Co.  
JOHN M. BARRINGTON, Pres't American Nat'l' Bank.  
BROOK H. E. JARVIS, Pres't Colt's Fire Arms  
Manufacturing Co.  
THOMAS O. ENDERSON, Sec'y Aetna Life Ins. Co.  
LEVERETT BRAINARD, of Case, Lockwood & Brainard  
and

GEN. WM. B. FRANKLIN, Vice Pres't Colt's Pat. Fire  
Arms Mfg. Co.  
AUSTIN C. LAMM, Pres't Williamson Linen Co.  
GEO. CROMPTON, Crompton Loom Works, Worcester.  
WILLIAM ADAMSON, of Baeder, Adamson & Co.,  
Philadelphia.  
WM. B. BEMENT, of Wm. B. Bement & Co., Phila.  
HOBART B. COOPER, Pres't Express Co.  
NEWTON CASE, Case, Lockwood & Brainard, Hartford.  
WILLIAM S. SLATER, Cotton Manufacturer, Providence, R. I.

## Machinery, &amp;c.

## DROP HAMMERS.

The Best in Use.

THE STILES &amp; PARKER PRESS CO., Middletown, Conn.

## HYDRAULIC JACKS

## AND PUNCHES

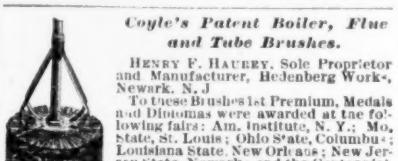
For Raising Heavy Weights  
Punching Iron, Etc.

## HYDRAULIC PRESSES

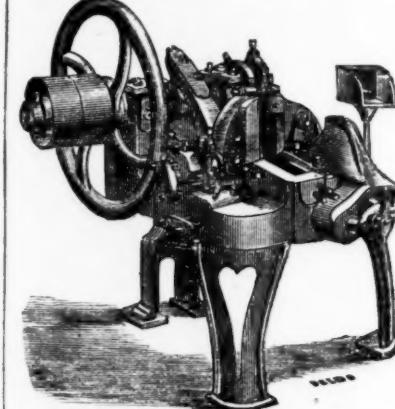
On hand and made to order.

Second-Hand Hydraulic Presses  
Bought and Sold.Machinery for Polishing and  
Buffing Metals.

Send for Circular.

E. LYON & CO.,  
470 Grand St., N. Y.

Coyle's Patent Boiler, Flue  
and Tube Brushes.  
HENRY F. HAUBER, Sole Proprietor  
and Manufacturer, Heisenberg Works,  
Newark, N. J.  
The Brushes were awarded at the following fairs: Am. Institute, N. Y.; Mo.  
State, St. Louis; Ohio State, Columbus; Louisiana State, New Orleans; New Jersey State, Newark; and the Centennial,  
Philadelphia, in America and England.



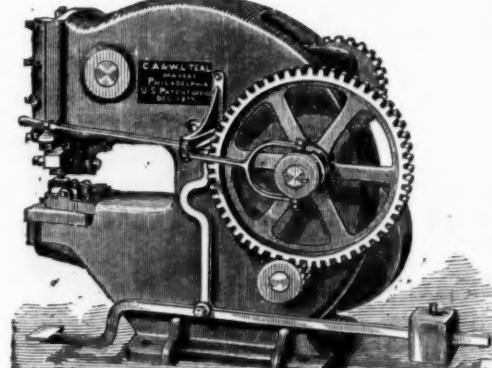
PITTSBURGH MFG. CO.,  
Manufacturers of Nail and Spike Machines, Patent  
Pile Driving Machines, Screw Cutters and Tappers,  
Bolts, Nuts, Washers, Rivets, &c., Castings, Forgings  
and Blacksmith Work promptly attended to.  
Office & Works, Railroad St., near 28th, Pittsburgh.

## C. A. &amp; W. L. TEAL,

No. 4116 Ludlow Street, PHILADELPHIA, Manufacturers of

IMPROVED BOILER ROLLS, COMBINED PUNCHING AND SHEARING MACHINES,  
SINGLE POWER PUNCHING MACHINES, with Shearing Attachments,  
FISH-BAR PUNCHING MACHINES,

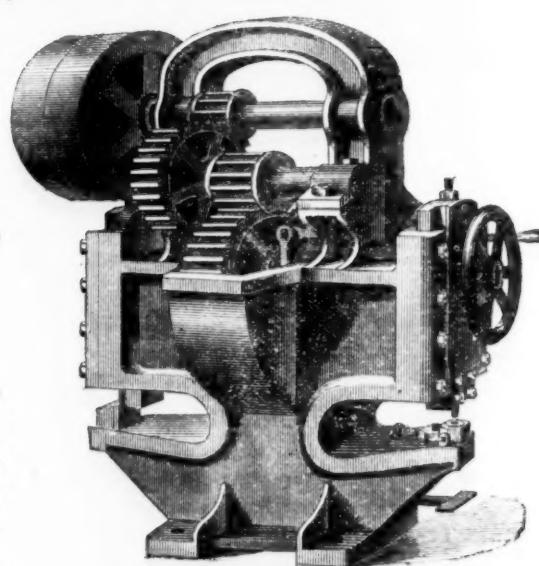
To punch four (4) holes and cut off the bar at one stroke.

Steam Riveting Machines, Boiler Makers' and Machinists' Post Drilling Machines,  
AND MACHINERY IN GENERAL.

## COMBINED PUNCH AND SHEAR.

Our regular pattern for boiler makers will punch and shear in the center of 40 inches, will punch  $\frac{1}{4}$  inch hole in  $\frac{1}{4}$  inch iron, and shear  $\frac{1}{4}$  inch plate; is provided with an automatic stop motion for Punch "Head" that can be set by the operator to stop the punch at any point of the stroke; as for different thicknesses of iron the punch can be set to stop within  $\frac{1}{2}$  of an inch of the iron after punching the hole, where it will rest until the work is adjusted for the next hole and the clutch thrown in. It is also provided with an adjustable stripper, a gauge and two "rests," one on each side of the die to support the work. Shears run while the belt is on the right pulley, but the punch can be operated by the clutch. When desired, punch end of the machine is provided with heavy bolts, giving ten inches reach to center of punch, and will punch 1 inch hole in 1 inch iron. We also make this machine with 12 inches reach on punch end, to punch 1 inch hole in 1 inch iron, and with shears set on an angle for splitting sheets and cutting off bars.

Our small pattern for boiler makers will punch 13-16 inch hole in  $\frac{1}{4}$  inch iron, 15 inches from the edge, and shear  $\frac{1}{4}$  inch plate 15 inches from the edge; is made for either hand or steam power or both.



COMBINED PUNCH AND SHEAR.

**TUBAL SMELTING WORKS,**  
760 South Broad Street, PHILADELPHIA.  
**PAUL S. REEVES,**  
MANUFACTURER OF  
**ANTI-FRICTION METALS.**

XXX	Genuine	17c
X	15c	14c
X	13c	12c
A	10c	12c
B	25c	10c
C	20c	10c

"Note.—The above are my standard mixtures, and have given satisfaction wherever used, but I am prepared to make Anti-Friction Metal of any quality or mixture desired by the purchaser.

INGOT BRASS.

OLD METALS AND TURNINGS WANTED.

BRASS CASTINGS.

ESTABLISHED 1842.

**WM. & HARVEY ROWLAND**  
PHILADELPHIA,

P. O. Address: Frankford, Philad'l'a.

MANUFACTURERS OF ALL KINDS OF

**Elliptic, Platform AND C Springs,**

MADE EXCLUSIVELY FROM

SWEDISH STOCK, OIL-TEMPERED and WARRANTED.

Swedish Tire, Toe, Blister and Spring Steel.

CAST SPRING AND PLOW STEEL.  
CAST SHOVEL, HOE AND MACHINERY STEEL.

OXFORD TOE, SLEIGH, TIRE AND SPRING STEEL.  
BESSEMER SHOVEL AND PLOW STEEL.  
BESSEMER MACHINERY AND CULTIVATOR STEEL.

RE-ROLLED NORWAY SHAPES.  
NORWAY NAIL RODS ROLLED AND SLIT FROM SUPERIOR BRANDS.

D. ARTHUR BROWN & CO., Fisherville, N. H.

Manufacturers of the original



Send for catalogue and price list.

**DERBY SILVER CO., Derby, Conn.**



Most Reliable Plated Spoons and Forks. A per cent more silver than usual standard. Highest Honor Awarded Centennial Exhibition, Prize Medal and Diploma. Send for illustrated catalogue.

**Iron Clad Mfg. Co.,**

50 Greenpoint Ave., BROOKLYN, E. D., N. Y.



THIS CUT REPRESENTS THE

IRON CLAD  
**FIRE SHOVEL**

The Best and Cheapest Shovel in the World.

**NEWLIN & YARDLEY,**

337 Market St., Philadelphia,

**HARDWARE JOBBERS**  
AND  
**Manufacturers' Agents**

SOLE AGENTS FOR

Union Steel Screw Co.,

Columbia Lock Co.,

Marshall's Shovels,

Florence Tack Co.,

Penna. Forge Co.'s Chains and Wrought Goods,  
REYNOLDS & CO.'S SET & MACHINE SCREWS,

AND

**Baldwin's Cast Steel**

FOR TOOLS, DRILLS, DIES, PUNCHES,

And all purposes requiring superior quality. Every bar warranted equal to Sanderson's, Jessup's and the best English and American Steel.

12c. per lb. to Wholesale Dealers,  
12c. per lb. in ton lots.

The Reading  
Bolt & Nut Works. **J. H. Sternbergh,** Reading, Pa., U. S. A.

Manufacturer of a Superior Quality of

**MACHINE BOLTS, HOT PRESSED NUTS,**  
Railroad Track Bolts, Boiler and Bridge Rivets, Bolt Ends, Washers, Wood  
Screws Turnbuckles, Refined Bar Iron, Etc., Etc., Etc.

**STANLEY G. FLAGG & CO.**  
PHILADELPHIA, PA.  
Office and Warehouse,  
No. 216 & 218 N. THIRD ST.  
Manufacturers of  
**STEEL CASTINGS.**

A Substitute for Steel and Wrought Forgings.

Circulars sent on application.

12 REASONS WHY  
Du Plaine & Co.'s Anti-Friction Metals  
SHOULD BE USED.

First.—Because they approach more nearly to what is required of a perfect Anti-Friction Metal.  
Second.—Because they have been tested thoroughly by the best mechanics and this fact established.  
Third.—Because they are made of refined and new metals, and not produced from drosses remelted.  
Fourth.—Because, being porous in their nature, they hold the oil necessary for proper lubrication.  
Fifth.—Because they are hard enough to insure a polished surface to the moving parts, and not de-

stroy or heat the journal.

Sixth.—Because they are free flowing, and if properly melted contain no dross.

Seventh.—Because by reducing the friction they increase the useful effects.

Eighth.—Because they are cheap and economical, reducing the expenditure of oil, coal, time, labor and wear of machinery.

Ninth.—Because the best mechanics use them.

Tenth.—Because, from long and extended experience as engineers and metallurgists, we try to produce the best metals that will give the best practical results, and we believe we have succeeded.

Eleventh.—Because we warrant our metals.

Twelfth.—Because we are open for competition from any respectable manufacturer of Anti-Friction Metals who can produce a better metal, a more reliable metal, and a cheaper metal than we make, and invite the test anywhere.

DU PLAINE & CO., Philadelphia.

**Russell, Burdsall & Ward,**  
PORT CHESTER, N. Y.

Manufacturers of

**Carriage, Tire, Plow, Stove.**  
AND OTHER  
**BOLTS.**

Carriage Bolts made from Best Square Iron, a Specialty.

**JOHN RUSSELL CUTLERY CO.,**  
Green River Works,

MANUFACTURERS OF

**Table and Pocket Cutlery,**

BUTCHERS', HUNTERS', PAINTERS', DRUGGISTS' & HOUSEHOLD KNIVES

IN ALL STYLES AND VARIETIES.

Highest Centennial Award.

Two Medals and Diploma of Highest Merit. First Home Manufacturers.

New York Office,

Factories,

97 Chambers

and 79 Reade Streets.



**DOOR SPRINGS.**

**"TORREY" Rod Springs,**

**"GRAY'S" Rod Springs,**

**"GEM" Coil Springs,**

**"STAR" Coil Springs.**

All of the BEST CAST STEEL

(not Bessemer) and at the

LOWEST MARKET PRICES.

**Van Wagoner & Williams,**

MANUFACTURERS,

82 Beekman Street, NEW YORK.

**UNIFORM SPEED** WARRANTED THE MOST PERFECT GOVERNOR IN THE WORLD

However great or violent may be the change of load, it will warrant any speed in the most rapid engine desired.

ADDRESS: HUNTOON GOVERNOR, LAWRENCE MASS.

No. 1, 2c.; No. 2, 25c.; No. 3, 2c.; No. 4, 15c.; No. 5, 10c.; No. 6, 5c.

UNIFORM SPEED

the change of load, it will warrant any speed in the most rapid engine desired.

ADDRESS: HUNTOON GOVERNOR, LAWRENCE MASS.

No. 1, 2c.; No. 2, 25c.; No. 3, 2c.; No. 4, 15c.; No. 5, 10c.; No. 6, 5c.

UNIFORM SPEED

the change of load, it will warrant any speed in the most rapid engine desired.

ADDRESS: HUNTOON GOVERNOR, LAWRENCE MASS.

No. 1, 2c.; No. 2, 25c.; No. 3, 2c.; No. 4, 15c.; No. 5, 10c.; No. 6, 5c.

UNIFORM SPEED

the change of load, it will warrant any speed in the most rapid engine desired.

ADDRESS: HUNTOON GOVERNOR, LAWRENCE MASS.

No. 1, 2c.; No. 2, 25c.; No. 3, 2c.; No. 4, 15c.; No. 5, 10c.; No. 6, 5c.

UNIFORM SPEED

the change of load, it will warrant any speed in the most rapid engine desired.

ADDRESS: HUNTOON GOVERNOR, LAWRENCE MASS.

No. 1, 2c.; No. 2, 25c.; No. 3, 2c.; No. 4, 15c.; No. 5, 10c.; No. 6, 5c.

UNIFORM SPEED

the change of load, it will warrant any speed in the most rapid engine desired.

ADDRESS: HUNTOON GOVERNOR, LAWRENCE MASS.

No. 1, 2c.; No. 2, 25c.; No. 3, 2c.; No. 4, 15c.; No. 5, 10c.; No. 6, 5c.

UNIFORM SPEED

the change of load, it will warrant any speed in the most rapid engine desired.

ADDRESS: HUNTOON GOVERNOR, LAWRENCE MASS.

No. 1, 2c.; No. 2, 25c.; No. 3, 2c.; No. 4, 15c.; No. 5, 10c.; No. 6, 5c.

UNIFORM SPEED

the change of load, it will warrant any speed in the most rapid engine desired.

ADDRESS: HUNTOON GOVERNOR, LAWRENCE MASS.

No. 1, 2c.; No. 2, 25c.; No. 3, 2c.; No. 4, 15c.; No. 5, 10c.; No. 6, 5c.

UNIFORM SPEED

the change of load, it will warrant any speed in the most rapid engine desired.

ADDRESS: HUNTOON GOVERNOR, LAWRENCE MASS.

No. 1, 2c.; No. 2, 25c.; No. 3, 2c.; No. 4, 15c.; No. 5, 10c.; No. 6, 5c.

UNIFORM SPEED

the change of load, it will warrant any speed in the most rapid engine desired.

ADDRESS: HUNTOON GOVERNOR, LAWRENCE MASS.

No. 1, 2c.; No. 2, 25c.; No. 3, 2c.; No. 4, 15c.; No. 5, 10c.; No. 6, 5c.

UNIFORM SPEED

the change of load, it will warrant any speed in the most rapid engine desired.

ADDRESS: HUNTOON GOVERNOR, LAWRENCE MASS.

No. 1, 2c.; No. 2, 25c.; No. 3, 2c.; No. 4, 15c.; No. 5, 10c.; No. 6, 5c.

UNIFORM SPEED

the change of load, it will warrant any speed in the most rapid engine desired.

ADDRESS: HUNTOON GOVERNOR, LAWRENCE MASS.

No. 1, 2c.; No. 2, 25c.; No. 3, 2c.; No. 4, 15c.; No. 5, 10c.; No. 6, 5c.

UNIFORM SPEED

the change of load, it will warrant any speed in the most rapid engine desired.

ADDRESS: HUNTOON GOVERNOR, LAWRENCE MASS.

No. 1, 2c.; No. 2, 25c.; No. 3, 2c.; No. 4, 15c.; No. 5, 10c.; No. 6, 5c.